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THE AMERICAN ARCHITECT AND BUILDING NEWS

VOLUME VII

JANUARY-JUNE

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IN beginning a new volume, we are obliged to ask the indulgence of our readers for any delay or irregularity that they may notice in the delivery or the construction of this number, and to beg that they will refer all such to the fiery experience we have suffered since our last issue. We will, in fact, hope that they may generously refer all our shortcomings whatsoever, so far as they may observe them, to the same cause. The fire which burned the stock and premises of our publishers destroyed all our manuscripts and matter for illustrations, including the copy we had prepared for this number, nearly complete as it was, and even the matter set up in type, which by a rare conjuncture happened to be within reach of the fire. It was necessary then to begin absolutely *de novo*, and to prepare this number afresh, under pressure of a haste which will, we trust, be held to excuse some degree of imperfection, — the more so since the Heliotype Company, which prints our illustrations, requiring as they do deliberate handling, was altogether stripped of its appliances and shelter. We assure those of our contributors who had sent us articles for publication, and especially those who had entrusted to us valuable drawings which it is not easy to replace, of our extreme regret for their loss. If any correspondents, owing to the destruction of their letters, find their communications neglected, we must beg them to favor us by writing again. We shall try to put our paper, as soon as possible, on the footing it would have held if it had met with no misfortune. To the friends who have hastened to help us in this emergency we give most hearty thanks.

THE fire itself ought to go far toward dispelling the notion, which seems to have been common, that the great fire of 1872 had been followed by any striking improvement of the methods of building in Boston. Some decided gains there were in a more stringent building law; in the abolishing high wooden roofs and wooden cornices, to the absence of which some of the neighboring warehouses now owe their existence; in somewhat heavier party-walls, which possibly saved the spread of the fire on one side; and in a greater number of iron doors and shutters, most of which proved a very idle attempt at defence. But the general character of the construction still remains the same, with a little freer use of material, corresponding to the larger and more expensive scale of the new buildings. There are the same wooden floors and stairways, the same flue-like combinations of communicating hollow spaces, the same general use of combustible material, with more hatchways and elevators. Almost all the precautions that were adopted were simply to check the spread of fire from one building to another. In this respect some gain is evident, and it is a thing to be thankful for. But as to the liability of any building to burn, or the danger to its contents and its occupants, if fire gets into it, there is no noticeable improvement. There is no appearance, unless in conspicuously exceptional cases, of any effort at fire-proof construction, or even at slow-burning construction.

IT is true that the seven years since the great fire have brought us much experience in the means of resisting fire as well as of its dangers that we had not at that time; and that while a specially new peril has come in with elevators, discussion and invention have furnished us with many devices for safety in construction and the use of material that were then unthought of. We are gradually learning that insurance costs more in the aggregate than safe construction; that certain parts of buildings are especially vulnerable, — stairways and elevators, for instance, — and ought to be made invulnerable; that where we cannot afford, or think we cannot, to build houses and warehouses that will not burn, we may build those that will burn but slowly; that solid wood is a safer material than iron, that either is safer for being protected by the other, or by plaster, and that brickwork is better than all. We are still far, nevertheless, from having reduced these principles to rules of practice, and still far in the rear of those cities of the Old World which have learned to care for their own security. The new work of Boston was mostly done before some of these principles of building had been verified and generally accepted, even by architects. In fact, the conviction grows upon us, while it comes too late, that in the rebuilding of Boston, whether from haste, ignorance, or want of enterprise, we lost a great opportunity. A writer in a conspicuous monthly magazine, reviewing the new buildings in Boston a year after the fire, and acknowledging the great improvement over the architecture they replaced, regretted in the interest of further improvement that if the fire must needs have come it could not have come a decade or two later. In the same way, in the interest of a safer construction, we may wish that it could have been delayed till the gradual growth of more suitable methods of building had taught our community the better way.

A QUEER case, to which we have already once alluded in our notes, is in litigation before the Court of Exchequer, in London. The Messrs. Botterill, architects, of Hull, had been engaged, some time ago, to make restorations of the fourteenth-century Gothic church, called Skirlaugh Chapel, near Hull. These gentlemen, it appears, were dissenters, and though they had built a good many schools and chapels for Wesleyans had done little or nothing of what is called in England "church work." The neighboring vicar of Nunkeeling took alarm, and wrote a letter of remonstrance to the committee who had the restoration in charge, complaining that the architects were Wesleyans, and could "show no experience in church work," and asking if nothing could be done to avert the loss which would be caused if the church were "ignorantly tampered with;" and again, in another letter, expressing his annoyance, asked if the committee were aware that the architects "are Wesleyans, and cannot have any religious acquaintance with church work." These he followed up with a memorial, which was signed by forty persons who were interested in ecclesiology, including the Dean of York and the Archdeacon of Cleveland. This led the committee to reject the plans of the Messrs. Botterill, and to put another architect in charge of the restorations. Thereupon the Messrs. Botterill sued Mr. Whytehead, the vicar, for libel, laying damages at five hundred pounds. The case was tried at the Leeds Assizes, and a verdict for fifty pounds was given for the plaintiffs. It was carried up to the higher court on a demand to set aside the verdict, with the plea that it was against the evidence, and on the ground of excessive damages.

IT is easy to see why an architect who had not done "church work" should for that reason be distrusted by ecclesiologists, or by other lovers of old monuments, when he came forward with plans for the renewal of a venerable Gothic church, a task which demands both skill and knowledge, as well as sympathetic handling. It is difficult to see, on the other hand, how a reverend vicar could help laying out trouble for himself when he put especial stress on the disqualification of being a Wesleyan, a mode of attack which gave color to the plaintiffs' accusation of malice, and drew from the Lord Chief Baron the natural remark that a man might "be a Mohammedan or a heretic, and yet have a professional knowledge of church work." When it came to substantiating their knowledge of church work, the plaintiffs did not fare so well; for although it was argued that they had once put a roof on a Gothic church, and that their design for the new restoration had been approved by Sir Edmund Becket, — which to many architects might not count as a high recommendation, — it was made to appear that the vicar of the church which they had re-roofed was one of the signers of the remonstrance against their employment at Skirlaugh, and that the architects to whom the plans for the restoration had been submitted — six names were mentioned, among them that of Mr.

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Gilbert Scott — had unanimously condemned them, saying that the spirit of the work would be destroyed and its value as a historical building sacrificed by them. A touch of genteel comedy was given to the trial when the counsel for the defendant read a passage from the Seven Lamps of Architecture, as an illustration of the vicar's feeling toward the plaintiffs, bringing out from one of the justices the inquiry whether, if the Seven Lamps had been written about living architects, he could not imagine Mr. Ruskin as a defendant in libel cases. A farcical tinge was added by the claim of the defendant's counsel that the fifty pounds damages which had been awarded, one tenth of the plaintiffs' claim, were excessive, and that they had not been injured to the value of a farthing by conspicuously withdrawing a commission from them, on the ground of incompetence, and giving it to another architect. The court reserved its decision.

An accident which happened in San Francisco not long ago illustrated an unexpected danger from bad drainage. A Mr. Cullen, plumber and gas-fitter, noticed a smell of escaping gas in his house, and having traced it to a water-closet investigated it with a lighted match. A tremendous explosion followed, which tore the plumbing apparatus to pieces and injured the investigator. By a simultaneous explosion in the connecting Eighteenth Street sewer, the street was torn open from Jessie Street to Mission Street, and a great blaze of gas went up from a broken gas-main at the corner of Mission Street. With a curious simplicity, the fire department brought a hose, and spouted water at the escaping gas in vain for an hour, we are told, before it was decided to put out the flame by burying the outlet under the upheaved earth, which was finally done, or by cutting off the gas, which might have been done, one would think. Examination showed that the trouble lay with the sewer, which, being old and of wood, had decayed. It had sunk in at the crossing of Mission Street a week before, and in doing so had broken the gas-main which passed beneath it. The escaping gas had gradually filled the adjacent sewer for a long distance, mixing with the contained air into an explosive compound, which made its way into the houses along the street, or at least into Mr. Cullen's. It is not strange that a city built in haste, as San Francisco was, should have wooden sewers, if it were sewered at all; but it would seem to be evidently time to do away with them now. One could have supposed, too, that the interval of a week would give time to find out and cure whatever mischief had been done by the caving in of a sewer at a street crossing. The explosion itself is an illustration, of which many are to be found, of the dangers of the gas-fitter's common trick of going about with a light in search of leaking gas. An exploded plumber under such circumstances might, perhaps take comfort in that his irruption has taken the place of typhoid fever or diphtheria, and be warned in time to no longer arrange his drains and soil-pipes so as to conduct gas into his house, while his customers might possibly benefit by his opportunity to learn necessary precaution at his own expense rather than at theirs. A curiously similar accident happened at about the same time in Oakland, across the bay, where gas from the gasometer had escaped into the brick sewers, and, permeating the adjoining houses, in due time blew up in two of them.

Some months since a fire occurred in a planing-mill and caused a fatality of a peculiarly distressing kind: The shavings and sawdust, which were made there in great quantities, were carried by an air-blast through a long chute into a chamber to which access could be had only through the chute mentioned. The fire caught while a man was engaged in cleaning out this chamber, and as he had no chance to escape except into the mill, he was burned alive like a fly in a fly-trap. This incident is called to mind by the statement made by the *Evening Post* that the operatives in the corset factory of Messrs. West, Bradley & Carey on West Twenty-ninth Street, New York, which was burned on the night of December 22, could not escape from the building because they were locked in. We do not find this fact mentioned in the more detailed account of this disaster which we have received, so we may hope that so needlessly criminal an act — for we can hardly suppose that the manufacture of corsets, however carefully they may be guarded after they are manufactured, is one which has to be conducted behind locked doors — was not actually committed. The fact remains, however, that a number of female operatives found it impossible to escape from a seven-story factory which had been on fire six times within two years, and was notorious for its inferior construction. Here was an opportunity for the interference of the society for the prevention of cruelty to women, which some one has suggested forming. And here still is an opportunity for some one who will deserve well of posterity if he can bring about very much the same reforms in the building of factories where many persons, male and female, are employed that, to a degree, have been effected in the construction of theatres. Any one who has been much in factories is familiar with the thoroughly irresponsible behavior of the ordinary factory-hand, the reckless way in which unprotected gas-lights are used, the slight and inadequate stairs, the wooden elevator-shaft, and the rough finish bristling to encourage the flame. The subdivision of large rooms by fire-proof walls, fire-proof stairways, and plenty of them, doors opening outward, fire-escapes, and reasonably good planning and construction should be as much insisted on in factories as a fire-proof proscenium wall, fire-screen, and ample exits in theatres.

Another need was made evident at this fire as well as in the fire in which we have a more personal interest. At both fires a large portion of the fire department was called out: it was found in one instance that there was no engine powerful enough to throw a stream to the top of the seven-story building, and in the other case that the most satisfactory impression upon the fire was made by massing three hose nozzles together, and so throwing upon one spot a stream large enough to produce an effect. These facts show a deficiency in our fire departments which should be supplied at once. A certain number of more powerful fire-engines are needed in every city, — more powerful even than the engines used by the London fire brigade, which, we understand, can throw a larger stream a longer distance than our ordinary engines. With us, even if efficiency is not often sacrificed to showiness, which we suspect it may be, everything is made secondary to the lightness of the apparatus, so that no time may be lost in getting a stream to bear upon the fire. To a degree, this is as it should be, but as every well-equipped army has its siege-train, as well as its flying-artillery, so every well-equipped fire department should have several engines, say one for each square mile of territory, capable of throwing half a dozen large streams. These engines need be called into service only when a general alarm is rung, and at such times they could hardly fail to demonstrate their value; for it has been shown again and again that the ordinary engine cannot cope successfully with a really large fire, even in its early stages.

It is possible that retributive justice was never more speedily visited on an offender than in the accident in Wilmington, Del., on the twentieth day of December, which was brought about by a seemingly flagrant case of jerry building. Late in the afternoon, the builder, a Mr. Ruth, his three sons, a mason, and a young child left two three-story buildings in the western part of the city, — not only left them for the night, but left them, as people were given to understand, completed. Shortly afterwards the whole party returned to search for some money that had been lost, and while they looked for it the buildings incontinently collapsed, and buried in their ruins the ignorant or reckless men who had prepared so flimsy a man-trap for unsuspecting citizens. Fortunately for the men, and unfortunately, perhaps, for the future welfare of their fellow-citizens, no lives were lost, and this is probably the last that we shall hear of an accident that has resulted from either the most amazing ignorance or the most criminal recklessness; for the only reason for the occurrence of the mishap that has been given is the possibility that the vibration of the floor caused by the passage of the tumultuous crowd of five men and a child, as they narrowly scanned the floor for the "lost piece," had such an effect on the party-wall that it was shaken down, and caused the fall.

MR. WHICHCORD ON THE QUALIFYING OF ARCHITECTS.

The new president of the Royal Institute of British Architects, Mr. Whichcord, in his address at the opening session last month, dwelt upon a question which is of present interest to architects, since it involves an unsettled problem which is continually recurring to them, — the qualifying of their profession. The Institute adopted two years ago a by-law which required that after a given time every candidate for election as Associate should pass an examination according to a standard to be determined by the council. In order to give due warning and time for preparation, the date when the by-law should take effect was

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fixed at May, 1882. The manner of carrying the by-law into force is referred to a special committee. It is possible that as the time for doing so draws nearer, the Institute begins to feel some misgiving as to the difficulty or the effect of carrying out its plan; but it is encouraging to note that the president supports the plan staunchly, and declares not only that some such measure grows more necessary, but that the improved position of the Institute makes it easier to carry out than it would have been five years ago. Mr. Whichcord did not think it desirable, even if it were possible, "to make our profession a close one," by which we suppose he means one in which nobody can lawfully practice without having complied with fixed conditions and being formally enrolled in it as in law and medicine. But he does think it desirable that every member of the Institute should be qualified either by examination under authority of the Institute, or by such a diploma from some educational body as shall be an equivalent for examination. The likelihood that there will be a falling off at first in the number of applications for membership of the Institute the president acknowledges and faces boldly, thinking that the Institute is bound to try its strength in such a test. He is strengthened in his position by the experience of other associations, quoting the example of younger associations, the Institute of Actuaries, for example, which without the advantage of a charter has, by enforcing an examination upon its members, attained such a position that only its fellows are known as qualified actuaries.

In regard to the subjects of examination Mr. Whichcord is not exacting. Passing over as of necessity the subject of æsthetic qualification, obviously out of the range of examination, he specifies as essential, and as fit conditions for qualifying, a knowledge of geometric and free-hand drawing, of the general principles of construction, and of the nature, qualities, and value of such building materials as are in ordinary use. Modern practice requires that to these should be added a knowledge of such sanitary subjects as ventilation and sewerage. Unless these conditions were applied in a very exacting way, they certainly require no more than an architect in ordinary practice ought readily to answer for, and would keep nobody out of a professional association, or out of the profession itself if they were made conditions to it, who had any real title to be in it. In the somewhat difficult question of the application, Mr. Whichcord met the dilemma of those who argued that it would be impossible to force examination upon the present members, and unfair to require of the new what the old had escaped, by quoting the example of the dentists. An act of Parliament, passed a year ago, required every one who would practise as a dentist to be enrolled, and subjected to examination by one of the bodies which are empowered to grant surgical degrees.

Mr. Whichcord had opportunity to learn of the working of the act in Dublin, and the account he quoted showed in an interesting way how a qualifying examination, though usually dreaded, may after all be rather a bugbear than a serious obstacle to anybody who is fairly qualified for practise. The examinations in Dublin were conducted by the College of Surgeons, and the form of it being left to the examiners, they adopted for the qualifying of men who were already established an oral examination *sine curriculo*, that is, we take it, not an examination upon any definite course of study, but an inquiry into the practitioner's competency to deal with the ordinary problems of ordinary practice, having, as a fellow of the Institute writes, "set no papers which would require a candidate of mature years to return to the half-forgotten exercises of youth," but by *viva voce* communication "elicited to their satisfaction whether the candidate was fairly and intelligently acquainted with his profession." It proved that the practising dentists offered themselves very readily for an examination of this kind, and that those who failed to pass, instead of being among older practitioners who had forgotten the formal teachings of their younger days, were mostly very young men who may be fairly assumed to have been imperfectly qualified for their work.

It seems to us that in this matter the example of the Institute and the advice of its president deserves the attention of associations of architects, and of architects who are not associated, in this country. The results of the experiment cannot be known till it is tried, but they are worth watching for, and we shall be surprised if such an experiment, tried with due seriousness and judgment, does not fully justify itself. An association, to try such an experiment, must either have prestige enough to make men willing to undergo some test for the sake of belonging to it, or else backbone enough to endure a temporary falling off of membership for the sake of a gain in solidity; but the second condition would, in our opinion, be pretty sure to soon generate the first. The subject is one which has often been set before the American Institute of Architects, without being ever brought to any practical result. If that body should undergo the decided change in constitution that is now under consideration, the change might give an opportunity to do something in establishing a technical qualification for its membership. Such a result, if it could be brought about, would be a greater justification of the change than any that we have seen offered. And apart from the Institute, any local association that exists or that might be formed for the purpose would, we believe, do itself service by submitting voluntarily to an examination test, if the test were strict enough to have any real significance. No existing profession has adopted or been subjected to restrictions of qualifications without distinct benefit both to itself and to the public. The dentists, who are the newest comers and have shown themselves more progressive, on that side at least, than architects, are examples of the benefit of it. We have argued before, and do still, that it would be reasonable that the public should by law impose upon architects the necessity of technical qualification, — and here we do not agree with Mr. Whichcord's reluctance to make the profession a closed one, as we understand the term, — for the greatest benefit of this qualification would be the public's, and it is in the public's interest before all that it should be demanded. But for architects themselves, who have either pride in their profession, or public spirit, or even a far-seeing eye to their own ultimate interests, there is no doubt which way their interest lies. "What real measures do you take," says an eminent queen's counsel, quoted in the address before us, "to secure that men calling themselves architects should know anything of architecture beyond what they pick up in the offices where they sit for a time copying drawings and specifications?" There are countries in which such measures are taken to this end, and the countries and their architects are the better for it.

THE LIGHTING OF SMALL SCHOOL-HOUSES.

THE principles of fenestration and orientation, in their application to school buildings of importance, containing many rooms, have been so thoroughly discussed that all architects who have had their attention called to the subject are familiar with what is now settled as the best practice for such buildings; but the rules, once learned, are often in danger of being applied to a class of schools whose inferior size and importance, instead of rendering them simpler subjects of treatment under the given doctrine, separates them into a class by themselves, with different requirements, and different modes of supplying them.

The given data are the same in all cases; we know that the sun rises in the east, is at its highest point in the south, and sets in the west; we know also, positively, the good and bad effects of different kinds and degrees of lighting, and varying amounts of sunshine, upon the eyesight and health of children; and applying these data to large buildings, certain rules for such structures have been deduced, in the same way that by applying them to small buildings we shall deduce rules differing from the former, but not less reasonable and necessary in their special province.

It is agreed by all authorities that the most comfortable and wholesome light for the eyes is that coming from one side only of the room, without interfering cross-lights from windows in the opposite side or from front or rear, and it is furthermore desirable that the light should come from a group of windows, or a single one, rather than from a succession of them, separated by wide piers.

For writing or drawing, the light should come from the left, not exactly at the side, but a little in front; then neither the right hand nor the pen will cast a shadow on the paper. For reading, the light may come from either side, indifferently, but should be a little back, that it may shine brightly on the page.

For any purpose, the window must not be far off, or the light will be too dim, even though it may come from the right quarter.

In arranging the more important schools, containing four or more class-rooms on a floor, only two modes of lighting are practicable; one, by windows in two adjacent sides, the other, by windows in one side only. Of these two alternatives the latter should always be chosen. The confusion of cross lights at right angles to each other is very injurious to the eyes, and the slight advantage to be gained for ventilation by windows in the adjacent sides of a large room is not sufficient to weigh against the defectiveness of the lighting so obtained.

The openings in the one illuminated side should be numerous and large, or the more distant portions of the rooms will be too dark, and the seats should be so arranged that the light in each room will fall upon the left side of the pupils.

Under this arrangement, with lofty rooms and large openings, the comfort of the eyes is at its highest point, and it is therefore com-

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pulsory in all German schools of every grade, and has become a common requirement in planning the better class of school buildings in this country. For our climate, however, it may be seriously questioned whether, in small houses of one or two rooms, the value during the hot weather of the cross ventilation obtained by opening windows in two opposite walls does not compensate for the inferior quality of the lighting.

Some French schools have endeavored to meet the difficulty, and combine good light with ventilation, by piercing two opposite walls with windows, and then concealing those on one side by permanent screens, like blinds, which allow the air to pass, but not the light.

This expedient answers for high and well-lighted rooms, but there is further difficulty in the fact that, in our low-studded district and ungraded schools it is impracticable to admit from a single side sufficient light to supply the needs of the scholars. The minimum approved proportion of window opening for a school-room is set down at one sixth of the floor area, some authorities demanding more.

In one of our average rooms, thirty by forty feet, the necessary window area would thus be two hundred square feet.

Unless this amount of glass surface is provided, the pupils in the parts of the room farthest from the windows will suffer from insufficient light, which is far worse for the eyes than any possible cross-lights. Now a simple calculation will show that, supposing the ceiling to be twelve feet high, and the windows to extend from a line four feet above the floor to within a foot of the ceiling, to obtain the amount of opening demanded would require a succession of windows, say three and one half feet each in width, occupying the entire length of the longest side of the room, with piers between only twelve inches wide. It is plain that such a construction, though not impossible, is very different from anything which has ever been seen in our country school-houses; yet nothing short of this would give the remoter parts of the room even a bare sufficiency of light, and not that if any darkening by shades or blinds were permitted.

From these reasons it follows, we think, necessarily, that whatever may be the best practice in large buildings, whose high stories admit windows lofty enough to furnish the requisite surface of glass, without reducing the piers to an impracticable slenderness, and where artificial or forced ventilation keeps the air fresh without effort, small buildings of cheap construction can, as a rule, be neither properly lighted nor efficiently ventilated without windows in two walls, and these walls should always be those on the right and left of the pupils as seated.

By this arrangement ample window space can be easily given, with allowance for partial darkening by blinds at times; the light, though less comfortable to the eyes of perhaps half the scholars than would be that from a single direction, will be more comfortable to the remaining half, and far more so to all, teachers and pupils included, than would be the case with windows in two adjacent walls, while the advantage of being able to change the air of the room in a few moments by opening windows in opposite sides, or by the same means to maintain a current in hot weather, is, in our climate, of very great importance.

Adopting, therefore, the principle of lighting by opposite windows, it is necessary to consider the most advantageous aspect for these windows; in other words, presuming that the openings will be made in the longer side of the parallelogram which constitutes the plan of the main school-room, the proper direction of the longer axis of the room is to be determined with reference to the effect of sunshine in the room at different times of the day.

So far as the comfort of the eyes is concerned, the north light is preferable, as it is comparatively unvarying, and through windows so directed there will be no sunshine during school-hours, and therefore no need of shades or blinds, which are always to be avoided if possible.

But the health of children in other respects suffers very seriously from the deprivation of the sun's direct rays, so that steadiness of light must be sacrificed to the necessity for admitting them. Even the German rules recognize this, and require that while no room shall have windows on two sides, only drawing-class rooms shall face the north.

Next to the north aspect, the steadiest light as well as the greatest amount of sunshine is derived from one due south, and while a south window receives the sun nearly all day, the year round, the angle at which it enters is so great that the annoyance from it in hot weather is infinitely less than from the horizontal rays which stream through an east or west window at certain times. For this reason a south exposure is both cooler in summer and warmer in winter than an eastern or a western one, and while it secures the largest possible aggregate of sunshine, a south window needs less shading than any other, except one facing north.

On the whole, therefore, although many authorites hold a different opinion, the writer believes that the main room or rooms in small school buildings will be best placed with the longer axis directed due east and west, and lighted by windows in the north and south sides only. With windows in the east and west wall, as some advise, the sun's rays will indeed traverse the room from side to side, but only at the times when their purifying and life-giving quality is at its least, and their power of annoyance at its highest.

Such a room is unendurable in summer afternoons without much pu'ling down of shades and closing of shutters, processes as disturbing to the quiet of the school as they are injurious to the eyes of the scholars, at the same time that the summer breeze is shut out together with the sunlight.

In winter a room so lighted is chilled on either side alternately, according as the northwest winds of March or the easterly gales strike upon the exposed surface of glass, making the room difficult to warm, unless by using two furnaces, one or the other to be used, according to which side may be the cold one for the time being.

With north and south lighting, all these difficulties vanish. The condition of the room in relation to the furnaces will in winter be always the same, the north side being constantly cold and the south side warm, so that a single stove or furnace placed near the north side will at all times diffuse its heat uniformly through the room. In summer the north windows will never need shading, and those on the south rarely, as the rays of the sun at meridian will be so nearly vertical that they will hardly reach the top of the nearest desks, supposing these to be placed at the usual distance from the wall. Before or after noon, the sunshine would extend somewhat farther into the room, the distance depending upon the width of the windows and the depth of the reveals, and in winter the range would be much greater, though the annoyance would at that season be far less. In any case, the shading of a small portion of the window surface will cut off all the rays which can possible strike upon any desk, while a west window can be effectually shaded only by closing every crevice through which a horizontal beam can pierce. The advantage in hot weather of being able to leave all the apertures on both sides of the room wide open, with fractional shades, if any, over the south windows, can be best appreciated by those who have tried both systems of fenestration.

Nor is the sunning of the room by south windows less effectual, but more so, than by east and west. The most obvious influence of sunshine upon the atmosphere of a room is to set it in motion, the chemical processes of deoxidation or decomposition being too obscure for our senses; but both chemical and mechanical effects are produced with far greater energy by the noonday beams than by the heating though lifeless rays of a horizontal sun, and the circulation between the north and south sides of a room lighted from both quarters is the more active and constant, by reason of their greater dissimilarity in condition, one being always shaded and cold, and the other always warm. Shades and blinds should always be avoided as much as possible. Outside blinds, if any are necessary, cut off the air in hot weather less than inside blinds or curtains, but they are liable to be broken or become loose at the joints from the effect of weather and neglect, and they require so much wall space to fold back against as seriously to restrict the number and grouping of the windows. Inside blinds, if used, should have rolling slats and be well hung and braced. Shades are sometimes necessary, where the close grouping of the windows and the thinness of the wall give no room for folding back either shutters or blinds. These should not be dark; a brown Holland or unbleached linen color is pleasanter to the eyes. All cloth curtains are liable to be drawn in or out of the window in breezy weather, and torn or stained, and a very useful substitute may be found in a screen of unbleached linen, or even cotton, stretched on a frame the size of half the window, one sash, and sliding up and down on slips of elastic wood, like mosquito nettings. Such a screen over a south window will give all the shade required, and the window can be opened as wide with the screen as without it. With such provision for shading the south windows, nothing being necessary for those facing the north, and with windows starting four feet from the floor carried as near the ceiling as the construction of the building will admit, the cheapest district school may be made as pleasant and wholesome to the eyes of its occupants as the elaborate structures of our largest cities.

T. M. Clark.

VIOLLET-LE-DUC.

[We translate from the *Gazette des Beaux-Arts* a considerable part of an appreciative notice of Viollet-le-Duc by M. Edouard Corrooyer, who had been one of his pupils.]

Born in 1814, at Paris, Viollet-le-Duc, after studies which, begun at Fontenay-aux-Roses and finished at the Collége Bourbon, were to prepare him for the Polytechnic School, enticed by his taste for art, entered the atelier of Achille Leclerc.

Instead of following the beaten path, too narrow for his wide intelligence, through brambles which grew so much the thicker that they grew upon fertile ground lying fallow, he travelled through all France, studying, recording, and drawing buildings which had been ignored, or rather abandoned, and were called ironically Gothic. His studies, exhibited at the Salon of 1834, brought their author a third-class medal. He was then only twenty years old, but already proved himself an artist born, showing the peculiarity that is common to predestined artists, an astonishing facility, which was apparent from his earliest youth.

In company with Gaucherel, who was then only his close friend, as he always remained, but who became through his example and counsel the admirable etcher whom all artists love and honor, he set out in 1836 for Italy, whose monuments of all ages he studied. It was during this journey, which lasted a year, that he visited Sicily, concerning which he afterwards published a charming volume, illus-

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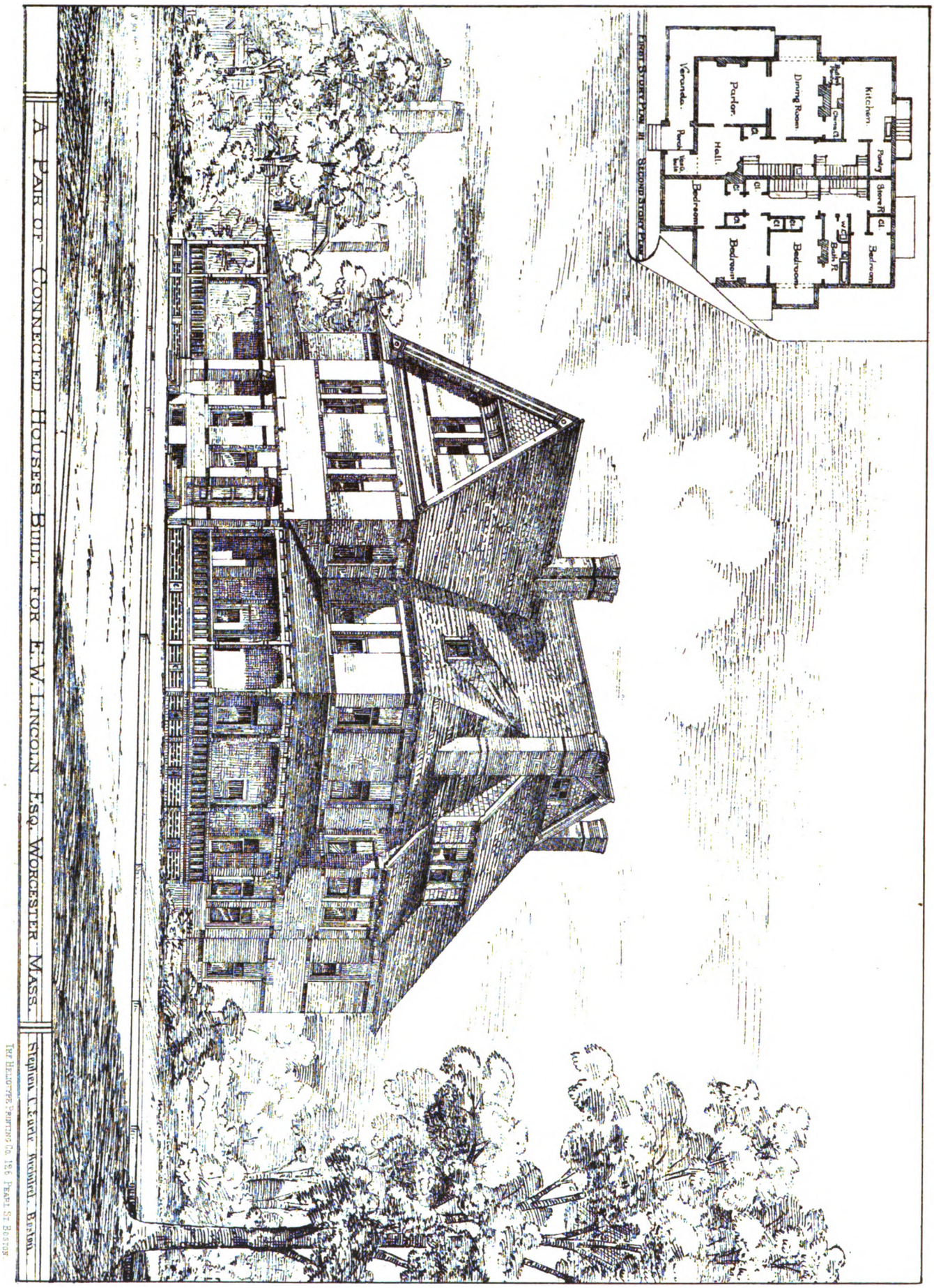

A PAIR OF CONNECTED HOUSES BUILT FOR E.W. LINCOLN ESQ. WORCESTER MASS.

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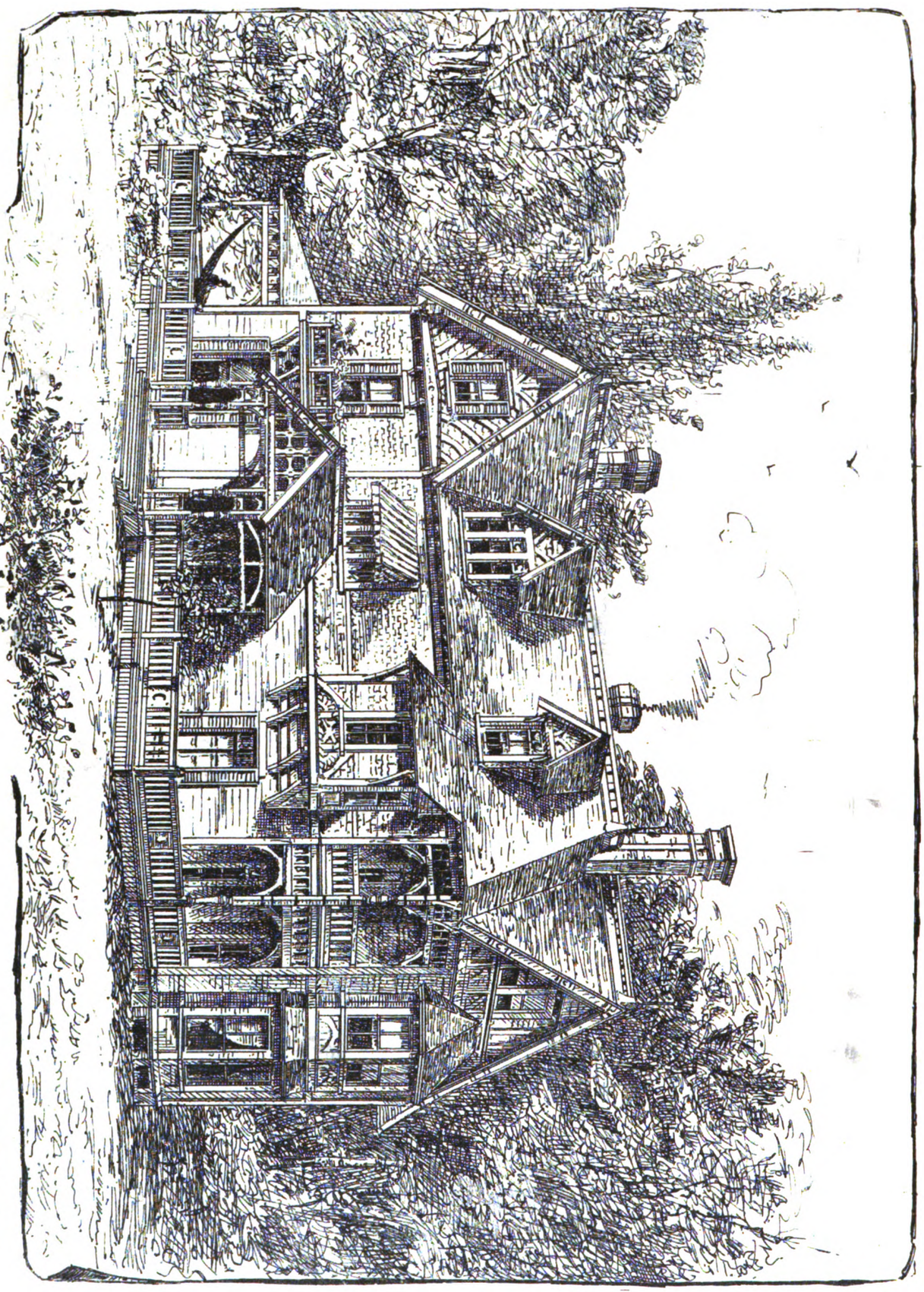

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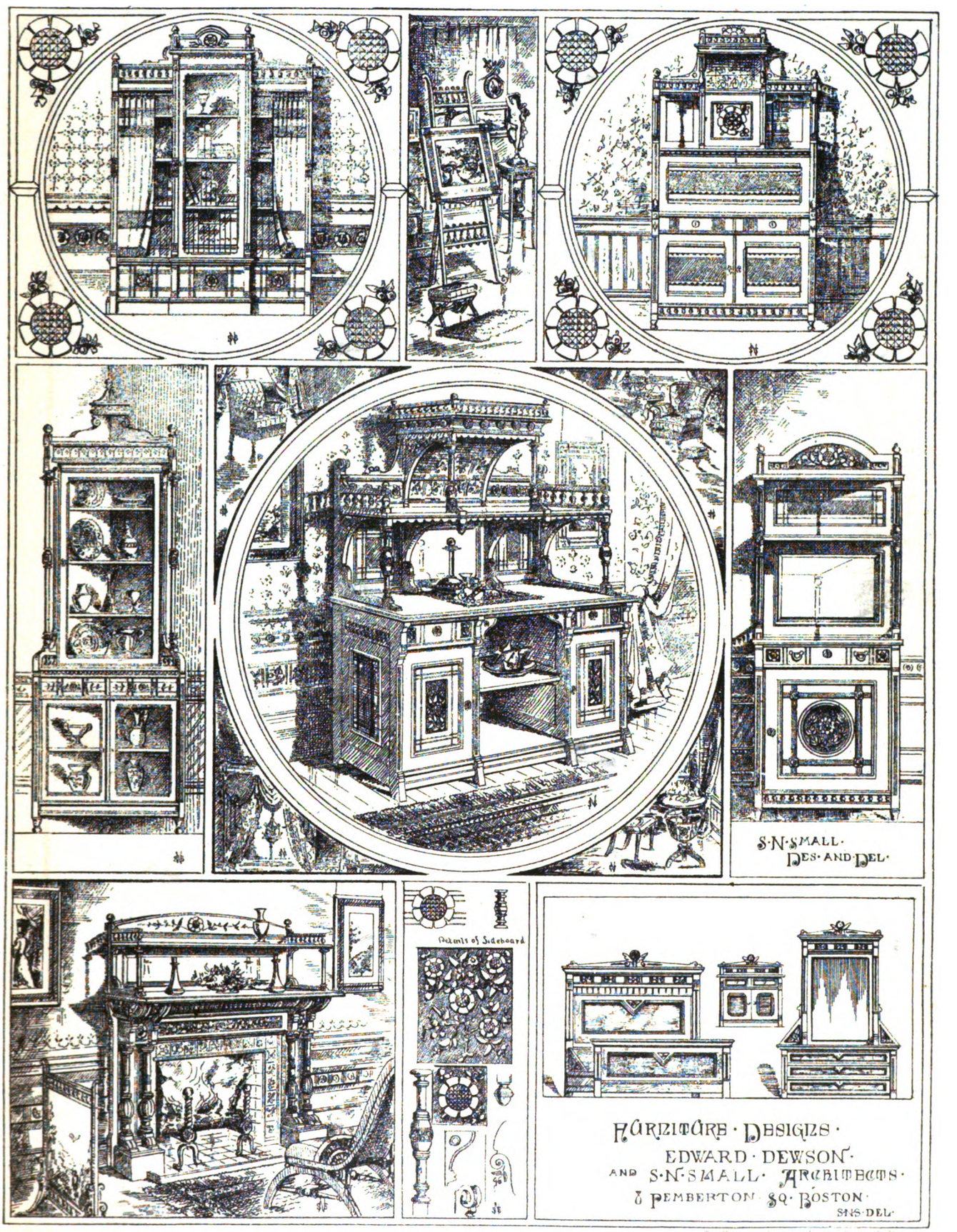

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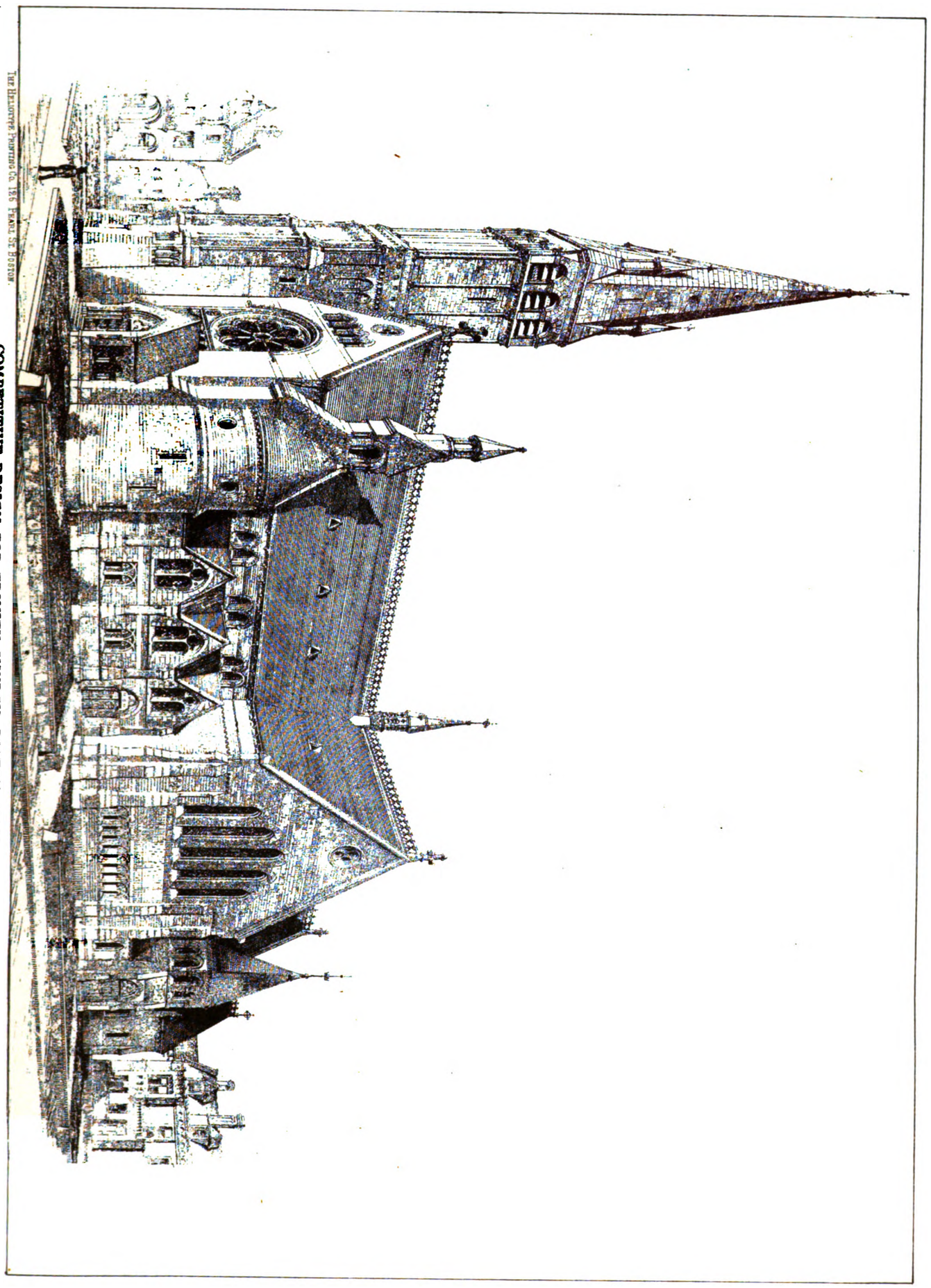

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COMPETITIVE DESIGN FOR TRINITY CHURCH, BOSTON, MASS.

STURGIS & BRIGHAM, Architects.

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trated with fine sketches. (Letters on Sicily, 1840.) He brought back countless documents, drawings, sketches in water-color, some of which, especially his restoration of the theatre of Taormina, excited a veritable admiration, won him a second-class medal at the Salon of 1838, and established his reputation.

But about this time was founded an institution which has powerfully contributed to the preservation of the precious buildings of all schools of architecture which past ages have left us, and which, as a whole, comprise the monumental history of our country: the Commission on Historical Monuments, appointed by decree of September 29, 1837, presided over by M. Vatout, Superintendent of Civic Buildings, and composed of MM. Leprévost, L. Vitet, Montesquiou, Baron Taylor, Carristie, and Duban, — Prosper Mérimée, Inspector-General, being its secretary. Despite the smallness of the appropriation allowed (200,000 francs in 1837), the preservation of our monuments was thenceforth assured, thanks especially to the aid of two distinguished men who filled in turn the office of Inspector-General, Ludovic Vitet, who gave so strong an impulse to archæological study, and Prosper Mérimée, who replaced him in 1833, and who gave to the work that had been undertaken a direction whose excellent results were quickly felt. The commission had from the beginning called to its aid experienced architects, who became its collaborators, and among whom we may mention MM. Charles Lenormant, Duban, Labrouste, Lassus, etc., as well as Viollet-le-Duc, who soon distinguished himself among these celebrated names. . . . .

Besides the archæological works of all kinds with which he was charged, the individual works of Viollet-le-Duc are many. Conceived and executed without regard to the precepts of official instruction, they were as passionately attacked as they were courageously defended. If they are open to criticism, like all human works, they show an effort unceasing, if not always successful, for truth in all its forms. Still, they were only an incident in the life of Viollet-le-Duc, all whose energies were centred upon the study and teaching of French architecture. This was the one abiding purpose of his life, which may be cited as one of the finest examples of intelligent activity. Before all things a man of action, marvellously gifted with various aptitudes, served by an iron temperament and energy, his great brain took in all branches of human knowledge, and his works, of considerable didactic interest, are, and will remain, imperishable monuments of learning, of skill, and of art, condensing under an admirable form, with the embellishment of drawings still more admirable, the fruits of the study of all known monuments, augmented by researches made in libraries everywhere, with the patience of a Benedictine. . . . .

Viollet-le-Duc exerted considerable influence on the study and practice of architecture. He knew how to collect about him a great many artists stimulated by his liberal ideas, and strengthened by his example, who have already shown their vigorous quality in remarkable works, and who will make it their effort to follow with honor the route which their illustrious master has gloriously marked out. This influence extended to the very workmen, necessary auxiliaries in any architectural work. . . . .

Viollet-le-Duc had an admirable understanding of the special position of the architect. He formed in the many workshops which were opened in various parts of France, for the restoration of our mediæval buildings, a nursery of mechanics, skilful and devoted workmen, whom he animated by his creative breath, so to speak, and whom he sustained by the example of his indefatigable and fruitful activity. He revived the Master of the Works, a functionary whose title is much more positive than that of architect, and of much wider meaning, for in Works we must include, as was done in the Middle Ages, all the fixtures and the furnishings of the building, from its foundations to the smallest details of its furniture, its tapestry, lamps, and even jewelry.

Viollet-le-Duc carried the art of the draughtsman to its farthest limit, and his extraordinary skill of hand, the ready servant of a marvellously clear mind, was only equalled by his profound knowledge of effects, securely rendered with the most surprising simplicity, which filled with admiration the numerous students of the course in drawing which he directed for eight years at the National Drawing School, and which has been so well continued by his friend, M. Ruprich-Robert. The numberless details, too, which he gave on the ground, after having drawn them for the most part under the eyes of the workmen whom he was directing, and whom he raised in their own eyes, by treating them as his collaborators while giving them technical explanations suited to their several trades, from the mason and stone-cutter or the carpenter to the carvers themselves, are absolute models which deserve careful preservation. They should first be collected from the different counting-rooms of the work-yards which he directed, and which have become small museums, especially those of Notre Dame, at Paris, of Pierrefonds, of Carcassonne, of Amiens, of Rheims, etc.

If it is no longer possible, as in the Middle Ages, to have beside each of our great religious edifices a house called the Works, in which lodged the architect and the master workmen who from father to son were charged with carrying on the buildings, — as could be seen down to our day in Strasburg, where one of the halls of the *maîtrise* contained part of the drawings on parchment which have served for the execution of the porch of the cathedral, of the tower, spire, etc., — we could at least collect them so as to prevent their being dispersed, after having been the object of more or less profitable speculation. Nothing would be easier, in my opinion.[1] These detailed drawings, whose number is very considerable, should be subjected to a judicious selection and classification, — it could not be better done, it seems to me, than by the Inspectors-General of historical monuments and of diocesan buildings, — which, arranging them in definite series, would then form, if not a complete monograph, at least a synthetical account of each of the great buildings restored or reconstructed by Viollet-le-Duc. These collections might be preserved at the Trocadéro, in the Museum of French Sculpture, of which he was one of the most ardent promoters. They would be, in any case, incomparable models for schools of art, profitable to all artists, and particularly instructive to young architects — or even to those who are not so young, — in the difficult art of directing workshops. While waiting for this wish to be realized, it seems certain that an exhibition will soon be arranged. If his friends, and the many collections of his drawings, and especially the archives of historic monuments, will open their portfolios, this will be enough to make known in all its splendor the enormous work of the strong artist who has already taken rank among the greatest masters of French art, and who by virtue of this will have without doubt his place marked on the new city hall, on the façades of which Paris commemorates her most illustrious children.

THE ILLUSTRATIONS.

COMPETITIVE DESIGN FOR TRINITY CHURCH, BOSTON. MESSRS. STURGIS & BRIGHAM, ARCHITECTS, BOSTON, MASS.

A PAIR OF CONNECTED HOUSES FOR EDWARD W. LINCOLN, ESQ., WORCESTER, MASS. STEPHEN C. EARLE, ARCHITECT, BOSTON, MASS.

THESE houses are built of face brick, with Ohio freestone and black brick for finish.

ALTERATIONS TO HOUSE OF S. B. PRATT, ESQ., FOREST HILLS, MASS. MESSRS. CUMMINGS & SEARS, ARCHITECTS, BOSTON, MASS.

FURNITURE DESIGNED BY DEWSON & SMALL, ARCHITECTS, BOSTON, MASS.

MR. RUSKIN'S EXHIBITION OF PROUT AND HUNT.

WHEN the author of Modern Painters gave, thirty years ago, to an astonished public his critical thoughts on the artists of the day, he pronounced eulogium on Samuel Prout as follows: —

"We owe to Prout, I believe, the first perception, and certainly the only existing expression, of precisely the characters which were wanting to old art; of that feeling which results from the influence, among the noble lines of architecture, of the rent and the rust, the fissure, the lichen, and the weed, and from the writing upon the pages of ancient walls of the confused hieroglyphics of human history. There is *no* stone drawing, *no* vitality of architecture, like Prout's. I repeat there is nothing but the work of Prout which is true, living, or right in its general impression, and nothing, therefore, so inexhaustibly agreeable. Faults he has, manifold, easily detected, and much declaimed against by second-rate artists; but his excellence no one has ever approached," etc.

This high praise was no mere empty breath. Mr. Ruskin testified the genuineness of his appreciation by buying from time to time examples of Prout's work; and though he would probably not now assign to the artist so isolated a superiority as when the above passage was penned, in the face of the painters who have since grown and worked, some even under his own teaching, yet the preface and notes to the catalogue of the exhibition under review show that the critic's admiration is undiminished in fervor, and his discrimination has only taken on a finer edge. It is the same with William Hunt. Both in Modern Painters and in the comparatively more recent issue of notes on exhibitions, Mr. Ruskin has ever held up the water-color work of that artist as an example of right manipulation and healthy perception, and of sense of color only equalled by that of the Venetians. He bought the painter's pictures, and, more, he distributed many throughout the art-schools in England as examples, and now reiterates praise no less sincere if more reticent in expression.

The exhibition, then, of drawings and water-colors by Prout and Hunt, now gathered at the rooms of the Fine Art Society in Bond Street, by help of Mr. Marcus Huish and the kindly loans from some forty and odd owners, is organized in pursuance of the art principles and enthusiasms dear to Mr. Ruskin's soul, and fundamental to his teaching of many years. We may not all accept as inevitable the judgments of this critic; we may indeed differ widely from many; we may think that he has sometimes appeared to found principles upon a quicksand of opinion that the next tide of emotion has shifted; yet, taken altogether, there is no given teacher who, from practical work and profound study, has more right to talk to us about texture, and color, and light, and shade, pencilling and brush-work, than Mr. Ruskin; and, above all, there is now no one better able to discourse on the old story of "eyes and no eyes," and to show how much may be missed for want of intelligent and loving observation, whether of art or nature. In the letterpress of the catalogue of this exhibition

[1] The Under Secretary of State for the Fine Arts has just given orders to seek out and collect all these drawings of detail.

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there is an amount of sound sense and discriminative criticism which would supply a dozen juvenile aspirants to the post of mentors to the public on art matters; and the friends of Mr. Ruskin must mark with satisfaction the regained balance of expression, not often marred by those super-emotional touches which detract from the dignity of criticism. We have dwelt thus long upon the right of Mr. Ruskin to be listened to, because, although he has always a surrounding of unreasonable and cliqueish disciples, there is also a danger just now from the reactionary band of "anti-Ruskinites" who forget the debt owed to the most faithful and poetic critic England has yet had the good fortune to possess; and thus between blind admirers and equally obstinate detractors we run equal chance of committing stupid injustice.

To a large section of exhibition-goers the show of pencil drawings by Samuel Prout will be quite a revelation of his power. All the showiness and crudity and sacrifice of true detail which often marred the artist's water-colors is conspicuous by absence from the beautiful drawings here gathered. Moreover, the range of subject is considerable — not only market-places beneath the shadow of cathedral towers, thronged by a busy crowd of vendors and buyers, or the façades of Gothic churches or fretted gloom of their rich interiors, but sketches of Rhine valley, with the broad windings of the river beneath its mountains, and Italian Piazze, views in Rome and Venice, and water-falls in Switzerland. Certain qualities of a great artist are notably impressed upon one by a sight of these collected drawings: the sense of scale, and power of suggesting depth and distance, the fine feeling for adjustment of opposing and converging lines of composition, carried into minutest detail in the architectural drawings, and the seizure of accidental conditions favorable to artistic effect. Messrs. Redgrave, in their usually solid and justly worded volume on modern English artists, have accused Prout of sacrificing precision and truth to picturesque effect; but the drawings before us show no such tendency. The observation might with more truth be applied to Prout's colored drawings, which are truly designated, when compared to his pencil work, "mechanical abstracts, made absolutely for the support of his household, from the really vivid sketches which, with the whole instinct and joy of his nature, he made all through the cities of ancient Christendom without an instant of flagging energy." The writers above named point out that Prout's architectural drawing lacks the "imitation" and the "knowledge of construction" which mark the well-trained pupils of the elder Pugin. But if sometimes a little shaky in line, they were never wrong in the most important truths, and in character supremely right. One might apply to Prout a word of criticism passed by Mr. Hamerton on the French etcher Méryon: "He has the Gothic sense of the multitudinous."

There are some points of approach and divergence in the life of these two artists, Prout and William Hunt. Both were sickly as lads, and this delicacy, apparently an obstacle to a successful career, led to the choice of a profession for which nature had designed them. Samuel Prout was born in 1783, at Plymouth, where Haydon was the companion of his school-days. When out nutting among the hedgerows, as a child of five, he had suffered from a sunstroke, and the after effects left him too delicate for his father's business. He came to London while still a lad, did work for Britton, author of Picturesque Beauties of England, and copied drawings by Turner, Cotman, and Mackenzie, to attain greater correctness and firmness of outline, exhibited in the Royal Academy when twenty-one years old, and some ten years later was made member of the Water-Color Society. Hunt, on the other hand, was born in 1790, a Londoner, in the then noisome purlieus of Long Acre, within influence of the poisonous strata of St. Martin's burial-ground, raised many feet above the footway by overcrowded burials. He too, and no wonder, was a delicate child, and the quiet profession of art was thought better for him than work at his father's tin business. He was apprenticed to John Varley; got some oil pictures hung in the leading exhibitions before he was eighteen; received, moreover, a helping hand and wise counsel from Dr. Munro, like so many other young artists. In 1812 he exhibited at the Water-Color Society's Gallery, which then admitted oils, and later was admitted as Associate in 1824, when the body gave itself exclusively to the art of water-color painting.

Prout, born in green Devonshire, never, strange to say, attained to the right drawing of trees and foliage; while Hunt, though cockney born, loved to paint the most rustic of figures and the most simple objects in Nature's treasure-house, birds' eggs and berries, wild blossoms and fairy fungi. Both artists worked after an unscientific and healthily enthusiastic manner, not fashionable in these self-conscious later days, and, delighting in art for its own sake only, lived to an old age without ostentation, laborious to the last. — *The Architect.*

NOTES ON IRON-WORK.[1]

BY GRAHAM SMITH, ASSOC. M. I. C. E.

The branch of science which enables the engineer to determine the theoretical amount of strain in the members of any proposed structure may be said to appeal directly to ordinary intelligence, and to be on the whole simple. The science, however, depends upon data and conditions, the exact influence of which can never be determined in actual practice. It is proposed, therefore, in this paper, to consider briefly some of the practical questions which affect theoretical deductions, and the design, efficiency, and economy of iron-work structures generally. The precise conditions under which iron-work will be constructed and worked being indeterminable, it becomes necessary, among other matters, to have some knowledge of workshop practice and routine in order to determine the proper limits and importance to assign to theoretical results.

In taking out strains it is usually assumed that each member has a normal length, whatever the amount of strain to which it is subjected, and that its conditions are the same as they would be were it free to turn in a plane about its extremities. Both of these assumptions are to a certain extent erroneous. So far from any bar having a normal length, that is, being perfectly rigid, it may be taken for granted that directly any piece of iron is subjected to a tensile or compressive strain its length is varied accordingly. Likewise no member of any structure is perfectly free to turn in a plane about its extremities; were it so, each junction would have to be made with an absolutely frictionless pin. In English practice junctions are frequently made with innumerable small rivets, which render them, to all intents and purposes, rigid. In America, however, pin connections are employed to a very large extent, and undoubtedly with pins and eyes properly proportioned efficient joints may be made. By a simple arrangement of parts theory can be more closely approached than with our complicated systems with riveted joints.

Variations in the temperature of the atmosphere likewise materially affect the strains in iron structures. When constructing an iron bridge a camber is given to it, so that when loaded it may assume a straight line, instead of exhibiting signs of apparent weakness by sagging. While testing the bridge it is usual to measure the camber as the load is put on, and it is not uncommon to find that on a warm day the camber is greater than it was the evening before, notwithstanding that a larger amount of load has been put upon it. This anomaly is due simply to the sun warming up the top flanges, and causing them to extend, whilst the bottom flanges have not extended to a similar extent, owing to being protected from the sun by a platform or the load upon the bridge. It has been ascertained that a variation of temperature in iron of 15° Fahr. will produce the same effect as one ton actual load per square inch. Therefore a change of 82.5° Fahr. will produce the same effect as 5.5 tons per square inch actual load, which is greater than the amount of strain supposed to be put upon any bar when under its full working load. Now, although the difference between the extremes of temperature in this country may be estimated at 82.5° Fahr., the extreme temperatures only act during a short portion of each twenty-four hours; and so, owing to the mass of iron and other circumstances, the temperature of the structure is seldom the same as that of the atmosphere; consequently the iron it not affected to the full extent just mentioned. There are, of course, many positions which will at once suggest themselves where the temperature is tolerably uniform throughout the year, and where accordingly no provision need be made for expansion and contraction due to changes of temperature. In exposed positions in this country an allowance of $\frac{7}{16}$ of an inch in each 100 feet should be made if it is wished to eliminate strains, which, it has been shown, may be of considerable amount. Edwin Clark has placed it on record that half an hour's sunshine has more effect on the tubes of the Britannia Bridge than the heaviest rolling loads or the most violent storms.

Questions of the foregoing nature having been considered, and the strains upon the various members of the proposed structure having been determined within reasonable limits, it becomes necessary to arrange the material to meet them. It is in doing this properly and economically that the art of designing iron-work consists. In all designs every endeavor should be made to employ iron of such dimensions and weights that it may be easily procured in the open market, and require only such workmanship as can be cheaply and readily performed. By attention to these points economy will be more surely attained than by the saving in the weight of iron which may be effected by adhering more closely to theoretical refinements. As an instance of this it may be stated that the actual weight of a plate girder is always very much in excess of its theoretical weight, and it is rarely the lightest form of girder which it is possible to design to carry a load. It is yet generally the most economical type to adopt for small spans, owing to the uniformity of its parts and the simplicity of its manufacture. While mentioning plate girders it may be well to state that although the theoretical economical depth of all girders depends upon their description, the loads to be carried, and a variety of other circumstances, the depth of a plate girder is often fixed by one consideration alone, and that of a practical nature quite beyond the control of the designer. It is simply the fact that plates cannot be rolled at ordinary rates over 4 feet 6 inches in width, so that the maximum depth of ordinary plate girders is fixed at 4 feet 6 inches. If this depth is exceeded it becomes necessary to plate the web vertically, which will enhance the cost of the work to an extent exceeding the saving likely to result from conforming more nearly to any greater depth which theory might dictate. In arranging the flanges, although theoretically the section of metal should be reduced at certain points, it is generally desirable, when a limited number of girders are to be made from one design, to keep the plates as nearly uniform in thickness as possible, rather than to vary their thickness so as to approach more closely to the amount of metal required to meet the strain.

[1] A paper read at the Mitcham Meeting of the Association of Municipal and Sanitary Engineers and Surveyors.

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However, where a large number of girders are to be constructed from the same design, the plates may be varied in thickness without increasing in any way the cost of the work, as the plates can be ordered in batches from the rolling mills and relegated to their respective girders in the manufacturers' yards.

At one time much of the iron employed for girder and bridge building came from Staffordshire; consequently, specifications were prepared in such a manner that iron from this district might comply with their stipulations. These specifications have been copied and recopied even up to the present time, notwithstanding that Staffordshire iron is now rarely put into ordinary iron-work, for the reason that the sizes of the iron supplied from this district are small when compared with those from the north country. This is owing to the Staffordshire mills working with plant which was put down many years since, whilst the iron-works in the Cleveland district are provided with more modern machinery and improved appliances. A South Staffordshire plate to cost the ordinary market rate must not be over 4 cwt. in weight, 15 feet in length, and 4 feet in breadth, and about 30 superficial feet in area; whereas Cleveland plates can be procured without additional cost up to 21 feet in length, 4 feet 6 inches in width, and 12 cwt. in weight, providing the area does not exceed 56 superficial feet. Although plates from the latter district may be obtained possessing as great a tensile strength, both with and across the fibre, as those from Staffordshire, they are not as a rule equal to the latter in toughness. Extra care should therefore be taken to test and thoroughly ascertain the quality of the iron, as it is sometimes very brittle. No attention whatever should be paid to "brand," as it is no criterion by which to judge of the qualities of iron usually employed for the construction of ordinary iron-work. A very fair specification for girder iron is 20 tons per square inch and 6 per cent elongation with the fibre; 18 tons per square inch and 3 per cent elongation across the fibre for plates; 22 tons per square inch and 9 per cent elongation for L's and T's; and 24 tons per square inch and 15 per cent elongation for rods and bars. These elongations ought to be taken on a testing section of uniform width for a length of 6¼ inches. In a length of 6¼ inches there are one hundred sixteenths of an inch, so that each $\frac{1}{16}$ elongation after testing represents 1 per cent. In preparing all samples for testing they should be drilled out of the plate angle or bar, and be either chipped or slotted to the required dimensions, and all tool marks carefully filed out, and the parallel portions should run in with curves of large radii to the portions through which the pin holes are drilled. In the event of there being the slightest shoulder at either of these points, it will have the same effect as a nick in the iron, which will generally render worthless the test for both tensile strength and elongation. With a little experience the quality of a plate may be determined to some extent by breaking the corner off over an anvil, and by inspecting the punchings from the plates. If the iron is brittle and untrustworthy, the punchings will show cracks in all directions if the punch be working as ordinarily with a little clearance, whereas if the iron is good and reliable slight cracks only will be perceptible, all running in the direction of the fibre. Whilst these workshop tests can be carried out in the manufacturer's yard by the inspector during the progress of the work, all tests requiring to be made with hydraulic presses or steel-yards should be conducted by independent authorities, such as Mr. Kirkaldy. After the material has been tested and passed, and the structure put together, it becomes necessary to apply a proof load, which consists of gradually placing on the structure a weight somewhat exceeding its working load. This is requisite in order to ascertain if the workmanship is up to the proper standard. It must, however, be always remembered that a proof load is no test of the strength of the structure or the quality of the material. If the iron is hard and brittle, it will give less than a material of more desirable quality, and the structure will apparently be stronger, but it is needless to state that such is not the case. Again, any part may be on the point of breaking, and yet not yield sufficiently to materially alter the deflection. Likewise, although a structure may stand the application of a proof load at the time of testing, it does not follow that it will stand repeated applications of loads of even less amount than the proof load. Fairbairn's experiments, carried out many years back, demonstrated this fact. He found that when the strain on the iron of a beam was between six and seven tons per square inch, the beam sustained an unlimited number of applications of the load producing this strain; but when the load was increased so as to put a strain of from eight to nine tons per square inch on the iron, the beam failed with a comparatively few applications of the load.

THE RESTORATION OF ST. MARK'S.

THE following is, I have reason to believe, the text of a report sent by the Minister of Public Instruction to the Minister of Foreign Affairs on the subject of St. Mark's, at Venice, and which will be transmitted for information to General Menabrea, the Italian ambassador in London:—

"The erroneous reports in England regarding the restoration of the Basilica of St. Mark's, at Venice, have given occasion to meetings held only after our Government had taken an active interest in those restorations, and, examining the question well, had decided to change the system followed. From what I am about to relate, your Excellency will perceive that those meetings had no *raison d'être*, inasmuch as the necessary instructions to secure the integrity of that Basilica had already been given some time ago. It is, indeed, too true that it was intended to rebuild the principal façade in the same way in which the northern front has been reconstructed under the Austrian Government and the southern under our Government, following the plan prepared by Austria, and perhaps if the administration of the Basilica had remained in the hands of the Ministry of Grace and Justice, that intention would have been carried out, inasmuch as works had already been commenced at the principal doorway and at the southwest angle according to the old system. But it is also true that when the Ministry of Public Instruction became aware of the danger which thus threatened the magnificent façade of that monument, and perceived that if it did not claim to itself the administration it would not obtain the fulfilment of its intent of seeing it restored in a proper manner, it hastened to demand that the funds assigned to that monument should be transferred to its estimates. This was done at the beginning of this year, and my ministry, having been legally authorized to provide directly, let no time be lost, but wrote in the month of May last to the Prefect of Venice to summon the Commission for the Preservation of Ancient Monuments to examine what had been done up to the present time, and determine clearly what might be necessary, studying well the questions of preservation and restoration, and laying down exact regulations as to the course to be followed for the future. The commission has already commenced its work, and this ministry awaits its resolutions to examine and submit them to the Superior Council of Fine Arts. And further, this ministry, to guard against any possible mistake, also ordered a thorough inspection of the Basilica, and the results having been a confirmation of the statements as to the many errors committed in the restorations, categoric order was given, which was instantly obeyed, and is still in force, that no further works should be executed by the *fabbriceria*, either in the reconstruction of the mosaics or in any of the decorative parts of the Basilica. From this your Excellency will perceive that not only have the English meetings no *raison d'être*, but it is demonstrated that the memorial they would make to our Government is, to say no more, superfluous. It is not necessary to enter further into details. I limit myself simply to giving your Excellency the more important particulars it is well you should possess, that you may communicate them to our ambassador in London, and I am persuaded that they will be sufficient to reassure affrighted souls, and demonstrate that if the love of art and the reverence for the memories of the past exist in England, that love and that reverence are not wanting in Italy, and that the Government, interpreting the general sentiment, has acted in the matter in accordance with its duty." — *Rome Correspondence London Times.*

MODERN IMPROVEMENTS IN COLOR.

THE Hindu arranges colors for a fabric with the same certainties of intuition that a bird weaves his nest or a spider its web. His blues and greens are harmonious in their combinations as those of nature herself, while the "educated" Englishman is now introducing every species of atrocity in form and color wherever he goes, ruining the beautiful native manufactures by instructions from this superior "stand-point," forcing the workers to commit every blunder which he does himself at home, in order to adapt their fabrics to the abominable taste of the middle classes in England. Even the missionaries, male and female, cannot hold their hands, but teach the children in schools and harems crochet and cross-stitch of the worst designs and colors, instead of the exquisite native embroidery of the past. Arsenic greens, magenta and gas-tar dies, are introduced, by order of the merchants, into carpets and cashmere shawls; vile colors and forms in pottery, and bad lacquer-work, are growing up, by command, in China and Japan. There seems to be no check or stay to the irruption of bad taste which is swamping the whole world by our influence. The Japanese have even been recommended to make a museum of their own beautiful old productions quickly, or the very memory of their existence, and of the manner in which they were made, will be lost. It is commonly supposed that the taste of the French is better than our own, and the pretty, the bizarre, the becoming, may indeed be said to belong to their domain; but high art is not their vocation. A certain harmony is obtained by quenching color, as in the "Soupir étouffé," the "Bismarck malade," the "rose dégradée," the "Celadon" of Sèvres china, all eighth and tenth degrees of dilution; but pure color, like that of Persia and of the East generally, they never now dare to dip their hands into. The gorgeous effects of their own old painted glass, the rose windows of the churches at Rouen, and in many other towns of Normandy, are far beyond their present reach. The stained glass of all countries in Europe, indeed, belonging to the good times, is a feast of color which none of the modern work can approach. At the present day the pigments used, we are told, are finer; the glass is infinitely better rolled, all the manufacturing processes have made wonderful progress, as we proudly declare; only the results of it are utterly and simply detestable — the colors of the great modern windows in Cologne Cathedral and Westminster Abbey set one's very teeth on edge. The temptation to use a stone (if it had come under one's hand) would be frightfully great in front of that at the east end of Ripon. There lies before me an old Persian rug, all out of shape, and twisted in the weaving, but full of subtile quantities in color, perfect in the proportions of its vivid brilliancy, and a grand new Axminster carpet alongside, of faultless construction,

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with a design as hideous as its colors are harsh. It is not only now with productions destined for the English market, but the degradation of art is beginning to spread all over the world. The standards of "instructed" European taste are vitiating the very well-springs of beautiful old work. The "mantilla" of Seville and the "tovaglia" of the Roman peasants are supplanted by frightful bonnets; the striking old costumes are disappearing alike in Brittany and in Algiers; in Athens and in Turkey they are giving way to the abominations of Parisian toilets for the women, while the chimney-pot hat is taking the place of the turban and the kalpac for the men. — *Lady Varney in the Contemporary Review.*

MARION COUNTY, INDIANA, COURT-HOUSE.

Indianapolis, December 22, 1879.

To the Editor of the American Architect:

Sir, — The case of Isaac Hodgson *vs.* the Commissioners of Marion County, a suit to recover $34,000 claimed to be due for services as architect of the court-house, was decided in the superior court, by Judge Elliott, in favor of the county. The circumstances giving rise to the litigation will, perhaps, be of interest to the profession. Two contracts were entered into between the architect and commissioners, — one in June, 1870, the other in September, 1872. When the contract of 1870 was made, the parties understood and intended that the basement and mansard stories were not to be finished, and in an estimate furnished by the plaintiff to the committee, the estimated cost of the court-house was $685,226. The contract of 1872 stipulated that Mr. Hodgson should receive for his services five per cent on the estimated cost. Afterwards, without any formal order of the board, the basement and mansard stories were finished, and other additions made, which increased the cost to $1,600,000. Mr. Hodgson will appeal to the supreme court, which is expected to reverse the decision of the lower court. J. H. S.

NOTES AND CLIPPINGS.

The British Architect. — Amongst the papers in our office which were destroyed by the fire was a letter from the publishers of the *British Architect*, offering to the new Boston Draughtsmen's Association a free subscription to that paper.

Fall of a Roof. — The roof of the large building occupied by E. A. Thompson as an iron and steel works, in Pittsburgh, Pa., fell, December 28, burying beneath its ruins a number of men. They were extricated as soon as possible from the débris of fallen beams and brickwork, but nine of them were found to be seriously injured, two fatally.

Building Accident. — At Newburyport, Mass., the floor of the vestry of Belleville church gave way last week, letting quite a number of people, who were present at a sociable, down several feet. None were hurt, but all were badly frightened.

A Canadian Academy of the Fine Arts — The Governor-General of Canada is much interested in the foundation of a Canadian Academy of the Fine Arts. The objects in view are the institution of a National Gallery of Art, the holding of exhibitions in the principal cities of the Dominion, and the establishment of schools of art and design. A constitution has been drawn up, which limits the number of academicians to forty, and there are to be associates, honorary members, foreign academicians, and honorary retired academicians. The officers of the academy will be nominated in the first instance by the Governor-General. The first regular exhibition will soon take place.

Eight-Inch Party-Walls. — By a singular defect in the building law in New York, three hundred buildings are said to have been erected in that city during the past season with party-walls only eight inches thick; but it is believed that they will hold together long enough to allow the builders to sell them. Then they may tumble down about the ears of their occupants as soon as they please.

Sir William Boxall. — The death is announced in London, in his seventy-ninth year, of Sir William Boxall, R. A., F. R. S., an English painter, and ex-director of the National Gallery. He was born at Oxford in 1800, and entered in his twentieth year the schools of the Royal Academy. In 1829 he exhibited Milton's Reconciliation with his Wife, in 1830 Cordelia, and in 1838 Hope. On his return from a visit to Italy, in 1833, he devoted himself to portrait painting, a branch in which he continued. In 1851 he was elected an associate of the Academy and in 1863 a full member. He has been a constant exhibitor. Among his works are several illustrations for the Waverley novels. At the death of Sir Charles Eastlake in 1865 he was appointed director of the National Gallery, and in 1871 was knighted by the queen. Ill health obliged him in 1874 to retire from his position. Sir William was an honorary member of the Madrid Academy of San Fernando.

Prize for an Architectural Treatise. — It is stated that the jury has decided that no one of the architectural treatises presented in competition for the prize of 25,000 francs offered by the King of the Belgians is worthy of receiving the prize. Two of the jury, however, were in favor of awarding it to MM. Van Bemmel and Coulon, for their study of the Church of Villers.

The Power wasted at Niagara Falls. — The amount of water passing over Niagara Falls has been estimated at 100,000,000 tons per hour, and its perpendicular descent may be taken at 150 feet, without considering the rapids, which represent a further fall of 150 feet. The force represented by the principal fall alone amounts to 16,800,000 horse-power, an amount which if it had to be produced by steam would necessitate an expenditure of not less than 226,000,000 tons of coal per annum, taking the consumption of coal at four pounds per horse-power per hour.

Macadamizing. — The late Mr. Macadam, before the introduction of the two-inch ring and six-ounce weight for testing the gauge of stones, used to bid the stone-breakers use their own mouths as a gauge; if the stone would not go into the mouth it was too large for the road. While superintending the making of a road, Mr. Macadam one day perceived some stones of extraordinary size: his wrath was kindled against the stonebreaker, a canny Scotchman, whom he forthwith accused of having failed to test the stones. The man denied the accusation, and solved the mystery by opening his mouth, which was of enormous capacity and entirely bereft of teeth.

Topographical Map of Italy. — An immense topographical map of the kingdom of Italy, which has been eighteen years in preparation, has just been issued by the Royal Engineer Department. It consists of two hundred and seventy-seven sheets, and is the most accurate and detailed map of the peninsula ever published.

Temple at Terracina. — As archæologists are aware, the remains of a temple consecrated to Apollo may be seen at Terracina. Its columns are still standing, but they were hidden by some masonry thrown up at a later period. The Commission for the Preservation of Monuments, having called the attention of the Ministry of Public Instruction to the fact, has obtained an order for the demolition of the unsightly accretions referred to; and the ancient edifice, or at least as much of it as survives, will be seen.

Discoveries in Taman. — Some explorations undertaken in the Peninsula of Taman, in Russia, have produced interesting results. Between Temruk and the station Sennaia a tomb dating from the third century before the Christian era has been discovered. In it was found a gold collar ornamented with lions' heads, a crown of the same metal adorned with precious stones, having in the centre a swan with a cupid on its wings; a round gold brooch with a pin representing Venus holding a cupid in her arms, a collar of pearls, ear-rings, chains, rings, bracelets in gold, and silver vases. The tomb is probably that of a young girl.

The Tashkend Railway. — The London *Daily News's* correspondent at St. Petersburg sends some details as to the proposed railway from Orenburg to Tashkend. This purely strategical line will be 1650 miles in length, and will cost, according to the Russian journals, about £11,500 a mile, making a total expenditure of nearly £20,000,000. That it can pay interest on its cost within any reasonable period is impossible; but this is to be remedied by the guaranty of five per cent interest by a Russian railroad bank. Altogether, the scheme is not likely to tempt European capitalists.

Marine Foundations. — A great deal of ingenuity has been spent by engineers in the construction of the foundations of light-houses and other similar structures. In some of these the stones are laid in off-sets to a considerable height above the rock, with the object of breaking the sea; each stone in the face is dovetailed vertically and horizontally into the adjoining stones, while a further precaution is taken by bolting each stone to the course below it by bolts of yellow metal and galvanized steel. Such a mode of construction was adopted in the Wolf Rock Light-House, off Land's End, considered the most difficult erection of the kind on the British coast. The rock on which it was built is seventeen feet above low water. In another structure, well known, the Bishop Rock Light-House, which, Findlay says, is probably the most exposed light-house in the world, the same construction is employed, and as a rule, in most sea-rock structures, massive blocks, dovetailed and dowelled together, have been used. A notable exception to this mode of construction was the plan devised for building the Phare d'Ar-men. The rock, Ar-men, presented formidable difficulties; it was almost impossible to obtain a secure footing; an iron structure was out of the question, on account of the difficulty of landing large pieces of iron framing; and, to make matters worse, the rock was divided by deep fissures. The method resorted to was as simple as it was bold: it was decided to bore a number of holes thirty centimetres deep and one metre apart all over the site, and others outside, in order to hold ring-bolts necessary for craft and to fasten lashings. In some of these holes wrought-iron gudgeons were fixed for the purpose of fixing the masonry to the rock, and thus to make the construction itself serve to bind the different parts of the rock together. In addition to these gudgeons, horizontal iron chains were introduced into the masonry courses to prevent disjunction. The gudgeons were .06 metres square and one metre long, made of galvanized iron, and the lower masonry was of small undressed stones set with Parker-Medina cement. Here we find a very different principle of consolidation necessitated mainly by the difficulties of landing large materials and also by the rock cleavage. Of course the object of dovetailing and dowelling the blocks together is not only to insure strength, but to prevent displacement of the masonry by the force of the waves during construction before the superincumbent weight of masonry could be brought to assist. In some other instances the courses of the basement are divided into a number of keystone-like parts, each of which is secured to the underlying stones by granite plugs let into the adjacent courses. Iron and screw piles have now superseded, in several cases, the solid foundations we have been describing, as in the instances of the Fowey Rocks, Ship Shoal, and other structures in the United States; but the engineer of marine works will probably sooner or later have to resort to a method of building foundations under water in which the advantages offered by the combined use of concrete and iron must be acknowledged. The government works at Dover harbor, and the harbor constructions at Douglas, in the Isle of Man, are instances in which concrete blocks of large size have been successfully employed; and the question appears to be worth a passing thought, whether or not, by the use of iron in the shape of piles or pillars, together with chain-bond, smaller blocks of concrete might not be used with more economy in structures which have to withstand the force of the waves, or in places where the employment of large blocks would be attended with risk and difficulties. Blocks of Portland cement concrete might be cast or moulded into forms capable of being interlocked together in the same manner as the stones of Eddystone, the Bell, and Wolf Rock towers, and these could be secured to the rock by a system of iron uprights and horizontal bars, so that the structure may possess both vertical and lateral cohesion under the most trying circumstances. — *Building News.*

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THE papers have been full for a week of the destruction of the Tay bridge. The disaster was indeed the most appalling of its kind: a half mile of bridge, with a train of cars containing a hundred passengers, disappeared instantly and absolutely in the midst of a violent gale, and not one survivor was left, nor anything to show clearly what the manner of the accident was. It was as unseen, mysterious, and complete as the loss of a ship at sea, and this in the middle of a river, close by a great town, on a moonlight night, and with men watching at either end of the bridge. The bridge itself was the last great achievement in bridge building of British engineers, and one of the most conspicuous, having called out great admiration, with some criticism and some prognostications of failure. It was built in the seven years between 1871 and 1878, at a cost of a million and three quarters of dollars, and was designed by Mr. Thomas Bouch, C. E., who is now Sir Thomas Bouch, having been knighted for this achievement. It was an iron lattice-girder bridge, of light and bold construction, in eighty-five spans, and nearly two miles long. The rails were carried on the upper chord of the girders except over the channel in the middle of the Firth, where for about half a mile the girders were raised so that the trains passed on over the lower chord, leaving a clear way beneath of eighty-eight feet above high water. A great part of the piers rested on a bed of clay overlaid with loose sand, the foundations being cylindrical iron caissons, thirty-one feet in diameter, sunk through the sand to the clay and filled with brick and concrete. Upon these hexagonal brick piers were built up to five feet above high-water mark and capped with stone. These carried trestle-piers of cast-iron columns, which under the raised girders consisted of four columns abreast, braced and stayed, and protected against the current and floating bodies by an additional starling or cutwater column on each side. The raised middle portion was in thirteen spans of two hundred and forty-five feet each, which were built continuously in sections of four spans, these being the largest spans in the bridge. This part, and a considerable length on each side of it, were straight, but the two ends joined the shores in long curves of 1,320 feet radius. The whole thirteen spans over the mid-channel were overturned with the train and disappeared, leaving only the brick substructures of the piers visible. The arrival of the train was signalled from the south end of the bridge, and persons who were watching for it at the north end speak of having seen what seemed to be a shower of sparks falling into the water, but there was no farther sign.

THE discouraging thing, from the engineer's point of view, is the difficulty of deciding, when all the evidence seems to be swept away, to what the disaster was due. If, as is apprehended, the quicksands at the bottom swallow up the train and the fallen material before they can be examined, this difficulty may never be overcome. Theories are common enough. It has been claimed that the bridge fell before the train reached it; but as we have said, the train was telegraphed north at the moment it reached the bridge, and five minutes later communication was suddenly broken. Some argue that it was the centrifugal force of the train coming round the curves that, aided by the wind, overturned the bridge; but the part that fell was the straight part between the curves, at a considerable distance from either. Others argue that the wash of the river must have undermined the piers; but it is distinctly stated that the masonry of all the piers remained. The complaint has been made that the girders were not sufficiently anchored to the piers; but piers and girders seem to have gone together. Another theory is that the train must have been blown from the track, and by its impact carried away the girders. This is the theory suggested by Sir Thomas Bouch himself, who supposes, it is said, that the falling sparks must have been struck out by the dashing of the train against the girders, — a rather far-fetched hypothesis, it seems to us. Yet it is difficult to see why the overturning of the train against one of the trusses should have carried down a whole half mile of bridge, girders, roadway, piers, and all, at least unless the whole mass was so critically balanced against the pressure of the wind as to be ready to fall, in which case the overturning of the train seems unnecessary to the result. A careful examination of details may give more decisive reasons for an opinion, but it looks as if the fallen section of the bridge must have been so near yielding to the force of the gale as to have been almost in a condition of unstable equilibrium, in which the added lateral pressure due to the resistance of the train to the wind was enough to overbalance the whole. The part that fell was the part which, being thirty feet higher than the rest, gave the greatest moment to the overturning pressure, and which, so far as appears, was under no other disadvantage; the whole of that part fell, and no more; it fell altogether as one mass, and the axis of its motion was apparently where we should expect, at the foot of the iron piers.

WHILE the bridge was building, two of its girders and a supporting pier were once blown down, and some engineers prophesied stoutly that the bridge could not stand against the winds it would encounter. Their prophecy seems to have been fulfilled. The engineers who constructed it, however, were confident of the security of their calculations, which, allowing, for a surface of 800 square feet in each girder exposed to the wind, an equal area in each pier, and the same for a passing train, give a total exposed surface of 2,400 feet for each span. With this surface exposed, they argued, it would take a wind pressure of 96 pounds per foot to overturn the bridge, whereas only 21 pounds was to be expected. The *Engineering News*, in reviewing the structure of the bridge, computes the exposed surface of each span with the added train to be really equivalent to three or four times as much, and claims a possible wind pressure of 40 or 50 pounds. We suspect that the *Engineering News* may come nearer the actual conditions.

THE extraordinary success and convenience of the elevated railways in New York have given a great impetus to building in the northern part of the island. The rapidity with which houses are spreading over parts of the city which before were neglected on account of the easier access of remoter suburbs, served by railroads, has roused capitalists who own real estate in the more eligible parts of the upper streets to consider how the new regions which are coming into the market shall be built up. The tendency which has shown itself in the lower part of the island to give the eastern side to poorer and middle class buildings, and to concentrate the more costly houses in the streets on the west side, gives the cue to a corresponding division of the upper parts, and there has been lately considerable discussion and some controversy as to how this distinction shall be maintained around and above Central Park, or whether it shall be maintained at all. An association of real estate owners, incorporated in New York last spring and called the West Side Association, has for its object, as specified in its certificate of incorporation, to protect and promote the interests of those who own real property on the western side of Eighth Avenue and abreast of the Park, or as far up as One Hundred and Twenty-fifth Street. They intend to build and maintain a library and reading-room within the limit of their jurisdiction, for which provision is made by assigning to it, in addition to what may be raised by special subscription, whatever may remain unexpended from the receipts of the association at the end of each year. The number and scope of the influences with which such an association may naturally be led to concern itself are suggested by the list of sub-committees into which this one has divided itself, namely, committees on Laws and Legislation, Taxation and Assessment, Parks and Public Places, Streets and Avenues, Rapid

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Transit, Croton Water, Buildings, and Drainage. Among the measures which have been advocated, as shown in the reports of their meetings, are the grading and pavement of Eleventh Avenue, the improvement of what is called Morningside Park, and the passage of a new building law.

There are a good many opportunities of public usefulness open to such an association as this, as to that which, with a somewhat analogous purpose, though with a different scope and a less personal interest, has lately been formed in Boston. However it may be in countries and times when towns grow slowly, it is certain that the rank and unregulated growth of our cities leads to a great many unnecessary sacrifices of general convenience and of beauty, and consequently to enormous after-expense when the time comes to correct mistakes, or to permanent deformity when it proves too late to correct them at all. In the rush with which in prosperous seasons we build up our new towns or quarters, there is no time for study of opportunities, or for a wholesome natural selection to make itself felt. Mere accidents of ownership, of caprice, or of passing individual convenience take the place and do the work that belong to forethought; mere routine and the habit of the surveyor or builder decide questions that need careful and skilful study. The permanent character of whole districts is often determined by a chance priority of occupation, especially in residence quarters, where one tenement-house, or two or three poor cottages, or half a dozen expensive dwellings, may set the fashion for generations. One member of the West Side Association urged at a recent meeting that persons who had built houses in that region to rent at six or seven hundred dollars a year had made a great mistake, and had found that those houses quickly degenerated into tenement-houses. Another argued in favor of such houses as profitable investments, saying that on the east side they were occupied as fast as they were finished; but the general desire seemed to be to encourage the building of more expensive houses on the west side, and to remand the cheaper building to the east side. As this agrees with the main tendency of things at present, it will probably be possible, with reasonable effort, to control it. Priority of occupation tells more than anything else in such a matter, and how much may be accomplished by it may be seen in the success of the Back Bay movement in Boston. The tendency of population to classify itself may be taken as irrevocable. The wealthier inhabitants of a town are sure, in the end, to be found collected in one quarter, the people of moderate means in another, and the poor in another. This being the case, it is a fair option with the proprietors or controllers of any given quarter to choose which class they will invite. A certain odium is apt to attach to efforts to reserve any territory for the use of the rich; but after all a place must be found for the rich as well as the poor, and the communities in which they live get the benefit of the outward beauty which the public shares with them.

Three things would seem likely to engage the attention of whoever is concerned for the condition of upper New York. The first is the river-front. On most of the east side, we presume, not much can be done for this, but at least the upper half of the Hudson River front is still open to salvage. The unnecessary degradation of the water frontage, which might be the most beautiful part of a city, both from the land and from the water, is one of the most unhappy mistakes, as well as one of the most universal, of our river and sea-port towns. It is due, not only to the claims of business, but to insensibility, and a neglect which in many cases borders on stupidity, so common and so unnecessary is it. One of the most singular instances is the Back Bay district in Boston, where in a region laid out with an idea of special elegance, and with perfect freedom and control of the conditions, the fronts of the first houses in the city were deliberately turned away from the finest prospect the city proper affords, and the superb river line given up to shabby back-yards and neglect, — a neglect which it has only very lately occurred to her people to try to remedy, at a considerable added expense. So in New York herself, the Battery, though it was saved by its public ownership from being given over to shipping and wharves, in spite of the unequalled splendor of its situation was perversely abandoned to shabbiness till two or three years ago an effort was made to redeem it. The excuse of remoteness will not apply to the upper shore, and, though the ultimate encroachment of the gradually extending fringe of piers cannot be estimated, it will be many years, at all events, before the upper half of the western water-front can be injured by them; while the western branch of the Hudson River Railroad, running close down by the water's edge, might easily be so dissembled as not to offend, and by a judicious use of roadway and margin, if the soap factories and other unattractive establishments which have begun to disfigure the shore north of the wharfage were choked off, a marginal avenue might be made which would be without parallel in the country, either for the beauty of its effect or for the attractiveness of the houses.

A second point is the interference of the building speculator. The speculative builder has his use in New York, where a great part of the householders want to get their houses ready-built. First and last, nine tenths of the population of the city, we suppose, have been housed by him, a considerable portion of them very well housed after their fashion, but with a monotony, a want of special study and of beauty, that makes the residence streets of New York drearier than those of almost any other city. He may build a good house or a bad one, — more commonly the latter, — but his object is profit and speed; and even if he had the sense of beauty or knowledge of effect, which it is not his business to have, he would not give the time and thought to the treatment of the quarters which he builds up that private owners might and must if they are to beautify them. His profit lies in the multiplication of the commonplace, and it is in vain to expect elegance from him. Where any effect of elegance is wanted, it must be the fruit of skilled effort and special study, and the speculative builder may be left to those persons who are not sensitive to their surroundings, or cannot pay to control them, who have no special requirements, or are content or obliged to slip into whatever house they find ready. The majority of householders in a changing community, like that of New York, cannot have their houses built to suit them; but many can, and the only way of accounting for the extraordinary rarity of houses so built, which is the peculiarity of that city, is by assuming that people have been in too great a hurry to think about their houses.

The third point is the subdivision of territory into house-lots. The laying out of streets as they are laid out in upper New York is not favorable either to beauty of effect or to directness of communication between important points; nor does it lend itself well to the best use of ground of an uneven surface, such as that of the northern half of the island. In this respect, however, the city is possibly committed beyond the likelihood of change, though it is thereby committed to great sacrifice of opportunity. The ordinary subdivision into lots of twenty-five by one hundred feet is still subject to modification, and has proved itself, though suited to the wants of the speculative builder, very ill adapted to the varied requirements of a city. It does well for shops, but the parts of the city where it obtains are those where shops mostly do not. For people who wish to build their own houses and to have them of different sizes and shapes it proves itself extremely inconvenient; and for apartment-houses, which are coming more and more into use, it is, by reason of the small proportion of outside wall to area which it gives, and the consequent lack of light and air, still more unsuited. However opinions may be divided between formal regularity and picturesque irregularity as a matter of elegance, the experience of many centuries shows that the convenient disposition of city territory is one which allows its inhabitants to go from point to point directly, without turning unnecessary corners, and gives them lots of land of all shapes and sizes for all sorts of uses. The older part of New York is on the whole a better model than the new.

We notice that some journals of other cities make the late fire in Boston a reason for attacking her narrow streets and recommending wider ones. Boston streets are narrow, and wide streets have their advantages, — their disadvantages too, — but the fire question has not very much to do with them. So long as houses are built to burn by the block, a few feet more or less from sidewalk to sidewalk will not make much difference. While adjacent buildings are so built as to set fire to one another, to widen the streets is but saving at the spigot to waste at the bung. When they are no longer so built the width of streets will not enter into the question. Reform, to be of use, should begin at the other end. The Boston City Government has already raised the question of making changes in her building laws. There is much room for improvement, and the first thing to secure, in default of actual incombustible construction,

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which is hardly to be looked for yet, is that warehouses and public buildings should have at least fire-proof stairs and elevators, mill-floors, and unfurred walls. Just as we write we hear of the fire in the Turner Hall, in New York, where the burning of the stairs destroyed four of the proprietor's family and injured six others, and doubtless some of them fatally.

ONE cannot help wondering who it is that encourages the manufacturers of building appliances to offer architects commissions for the use of them. We have received a card advertising a patent Automatic Valve Overflow Wash-Basin, and with it a supplementary card offering to architects who approve of the Automatic Overflow Valve "a commission of fifteen per cent for their time and trouble" in specifying it. The automatic valve is intended to exclude bad odors from the waste-pipe, and suggests the thought that the vent by which the proprietor thus disposes of his surplus profits is guarded by a similar contrivance. The extra cost of one of these wash-bowls is, we find by the card, $1.25. Fifteen per cent on this is eighteen and three quarters cents, — sufficient payment possibly for the clerical labor of adding a line to a specification that is already paid for by some one else; we do not know how many such commissions it would be necessary to return to the enterprising plumber in purchase of the wash-bowl that would be needed by the architect who would put his hand to such transactions. We commend this double-action device for simultaneously cleansing and soiling the hands of our profession to the *Sanitary Engineer*.

AMONG the losses which we owe to the fire which burned us out was that of our address-book. This is a matter of no small inconvenience, and we shall be obliged if all our correspondents will take pains to give us their addresses in full.

METHODS OF STUDY IN DRAWING.

[From Mr. Poynter's Lectures on Art.]

THERE is no doubt that the simplest way of beginning is to make copies of drawings in outline, beginning with easy forms, and progressing to the more difficult; and the School of Design drawing-books by Dyce are admirably adapted to this purpose. But this course may easily be carried too far, and in my opinion is useful only at the very earliest stage, as a means of acquiring steadiness of hand. The youth who comes to a school of art to study may be supposed to have displayed sufficient fondness for drawing to have practised it in some form or other from his earliest years, and therefore to have acquired some elementary knowledge. The surest and best method, therefore, for him on entering the school, is to begin to make outline drawings from the round, that is, from solid objects, by which, under proper direction, he can attain as great steadiness of hand as he could from the flat. In pursuing this preliminary course his object will be to train both eye and hand in an equal degree, by endeavoring to draw with certainty as well as with accuracy; that is to say, he should, after first adjusting on his paper the proportions of the object he is copying, try to make his outline at once clear and correct, and draw it with as firm and steady a hand as a young student can command under the difficulties with regard to accuracy which must beset him at the outset.

The object, then, of the student is first to attain to a definite conception of the form before him, and in this he will fail unless he can express it on paper with a definite outline; next, to acquire the power of expressing the form with certainty and rapidity, which he will never do if he acquires a habit of drawing inaccurately to begin with, though he may have the full intention at the time of altering his lines to get them right in the end. In the third place, he must acquire steadiness of hand. This he must gain by the habit of drawing his lines continuous from one determined point to another, without retouching, or, as it is called, painting the line, — a point as important in figure as in ornamental drawing; the quick, and at the same time certain, apprehension of the form he is copying, and the correct rendering of it on a flat surface being the end the artist aims at throughout his whole career.

Thus much conceded, the question arises as to the best models for a beginner to work from. My answer would be that he cannot do better than to begin with what he intends ending with, that is, the study of the figure.[1] All else is usually but time lost; at whatever stage the drawing of the figure is taken up, the student will find it as difficult as if he started with it at first. At the same time I admit that what are called drawing-models, that is, solid geometrical figures in wood, may be of occasional use in the case of young or helpless students. If a student, placed before a cast of a statue or head, shows himself incapable of rendering it in any way intelligibly, he may well be set to do a few drawings in outline from geometrical models; when, if he does not soon show signs of progress, it is probable that he has mistaken his vocation; but this is, of course, a matter for the discretion of the instructor, some students being much slower than others. It would be dangerous, however, to devote too much time to this stage of study; especially when carried to the extent to be observed in the schools of the Science and Art Department,[2] it involves a mere waste of time; and the student should practise by preference from casts of heads, hands, feet, etc., proceeding by degrees to full-length antique figures.

There is a danger, therefore, of the student acquiring a mannered way of seeing and drawing the muscular and constructional indications, and it is much better that he should proceed as soon as possible to study them as they really present themselves to him — that is, in light and shade — than that he should confine himself to a hard and unreal outline. I may, however, remark in passing that a student may derive much benefit in this early stage, if he looks at, and in leisure moments copies, good outline drawings of the figures, such as Flaxman's illustrations to Homer and Æschylus, so as to learn how far it is possible in pure outline to express the markings of the muscles and joints in the nude figure.

These illustrations have another advantage in being excellent studies of composition for beginners; and although Flaxman may sometimes be found to give to the faces of his heroes a somewhat exaggerated expression, through a mannerism, contracted apparently in the endeavor to impart to them something of the character of the ancient tragic mask, yet there is a knowledge of the human form, and a grace and purity of design displayed in the grouping of the figures and arrangement of the draperies, which is well worth the attention of the young student.

We suppose the student to have now arrived at the stage of what is commonly called "shading" his figures, and he enters upon the study of *tone*, which is probably, of all the departments of study to which he has to devote himself, the most subtle, the most complicated, and the most comprehensive. I might almost go on to call it the most important, for it is so intimately bound up with the study of form and color, that it cannot be kept separate, and is, so to speak, continually interfering with the apprehension of them. It is, however, precisely the point of which our English students, teachers, and painters (always omitting from the latter category certain men of eminence, but including those who practise the most popular kind of work) appear to have the most imperfect appreciation. This I believe to be due entirely to the general system of education in our art schools. You will find that as a rule the pictures in our exhibitions are, in their several degrees, strong on every point but this one.

I have no hesitation in saying that I believe most of the want of perception of unity of tone among our artists arises from the common habit of laborious work with the chalk-point. This use of the point, at all events in the way which is prevalent in our art schools, not only involves loss of time, and the sinking of the study of form and tone in that of mere execution, but concentrates the attention of the student on minute details which blind him to the general effect. It is for this reason that I have always advised my students to make use of the stump, rather than of the point, in shading their drawings; for the former, while it allows of any amount of finish of modelling, lends itself particularly well to the production of broad effects of tone, and is, moreover, much easier for a beginner to manage than the complicated method of shading with the point. There is, it is true, an intelligent use of the point in drawing, which proceeds naturally from the study of the construction of the figure; but it should be contracted in actual drawing from the figure, and the lines made in shading with the point should always be indicative of the construction. Any student who shows a disposition to work in this way with the point should be encouraged in the use of it; but for the majority the stump is by far the best means of learning to shade. As there is doubtless a certain amount of mechanical difficulty to be got over in its employment, it is here again that drawing models may be made use of in teaching the beginner how to make flat and evenly-gradated shades; care being taken that he does not spend more time over this than is necessary to facilitate his work for the future.

This first mechanical difficulty got over, the one main point the student has to attend to is the general tone or effect of the object he is working from, whatever it may be. And this he will find his great difficulty, not only as a beginner, but all through his course of study, and indeed through his life; it is so easy to see detail, and it is so difficult to subordinate it to the general tone. The student must constantly keep in mind his subject as a whole, while at the same time he does not omit to give all details their proper value. A prevailing fault with our students, and indeed with experienced painters, is that of making the reflections too strong, and therefore throwing the whole work out of tone. This fault arises among students from the desire to express distinctly everything that is seen; and in the process of doing this they forget the general balance of light and shade. With painters the desire is rather to give a spurious brilliancy to their pictures at the expense of truth. It is useless in making a study of a head, for instance, to have the proportions and features correct in outline, if in shading they are

[1] It must be understood that these remarks are throughout addressed to students of figure-painting for pictures. For ornamental design a more extended course of outline drawing from the first is necessary.

[2] As much time used to be wasted over highly-stippled drawings of cubes and cones in schools of art, as over the antique figures referred to in Lecture III.

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out of tone. A half-tint too dark, or a light too bright, will destroy the unity of the work, and will cause it to present an assemblage of features, each in itself possibly right, but bearing no reference to the general roundness of the head.

There is also in connection with this subject another point to which attention must be directed. It is not only by dwelling on detail that a student may err in not giving the proper tone to his figure; the whole key of the drawing may be too dark or too light. The former is generally the fault of students who are in earnest about their work; this arises from their looking too much at the shades with reference to each other, without due reference to the surroundings; that is to say, from their paying attention only to their *relative*, and not to what for convenience I may here call their *absolute*, strength in the scale of light and dark. It is very common, for instance, to see the darkest shadow in a drawing from a cast made absolutely, or very nearly, black. Now with reference to other shadows in the figure it may appear to be so — still more with reference to the lightest parts; but let the student look at anything really black (as, for instance, the shadow under the sleeve of a black coat), and he will then find the real value of the shade he is representing in the scale of tones in the room where he is working. This want of reference to the surroundings is the real cause of the blackness so frequently seen in drawings; by bringing the darkest shade to its proper value in the scale from black to white you will then have to lighten by degrees the whole of the rest of the shading to bring it into proportion, and the drawing will gradually acquire its proper tone.

The importance of the correct perception of tone has given rise in France to a system of drawing by tone merely, to the ignoring of constructive drawing; the result is that there is no school where tone (or, as they call it, "*les valeurs*") is better understood; the absurdities and crudities of modern English art in this respect being unknown there. At present the French devote themselves too exclusively to this side of art, and the result is that in their seeking after its subtleties they have almost arrived at the conclusion that one object is as good to paint as another; a female head or a piece of raw meat being looked upon as equally suitable for the exercise of their skill in painting. There is no necessity for carrying matters to this extreme; the great Italian painters were none the less masters of tone because they devoted themselves to the study of form, and to the higher points of construction and ideal beauty. But it must be kept in mind that no amount of anatomical or constructional knowledge of drawing is of value without a true perception of tone. A figure which, as we say, is "all to pieces" in this respect, however correct the outline, will never stand the light of intelligent criticism. It is our want of perception on this point that makes foreigner's laugh when they see our pictures; and with regard to most of our work of the more popular sort, the laugh is fully justified.[1]

VIOLLET-LE-DUC ON GOVERNMENT MANUFACTORIES.

[We find in a late number of *L'Art* the following autograph letter from M. Viollet-le-Duc to a correspondent whose name is not given. It is printed in fac-simile in *L'Art*, and is characteristic enough of the writer's progressive tendencies in art, — as in all other matters, — to be interesting.]

My Dear Sir, — Artists are not fit to manage anything whatever; they find it hard enough to manage themselves. The manufacture at Sèvres in the hands of an artist would fall, if possible, still lower. The artist would wish to impose his taste upon it, the spirit of clique would invade it, and we should have something either perfectly null or ridiculous.

In principle, neither the manufacture at Sèvres, nor that of the Gobelins, has any *raison d'être;* these establishments may have been of use at the time when the jealous power of Louis XIV. suppressed the corporations, and when it was necessary to substitute a royal monopoly for the monopoly which he suppressed. It is with this as it is with the academies, — under pain of seeing the fine arts and the manufacture of decorative objects lapse into barbarism, it was necessary to supply the place of the republican institution which was suppressed by a royal institution. But in our day this has no meaning. Private industry has emancipated itself by free competition, and suits its productions to the needs and tastes of the public.

To-day private manufactories make us beautiful tapestries which only differ from those of state manufacture in being six times as cheap, without exaggeration. They make porcelain at Limoges, when they choose, almost as well as at Sèvres, and the products of these private establishments even have an original quality which the house at Sèvres does not attain.

The elements exist; if the public taste rises manufacture will rise. It is its interest. It is for the education of the public, then, that we must provide in this as in many other things. The chief ill-effect, in my opinion, of these establishments supported by the state is that they give a certificate of perfection to objects which are often of a very inferior order. There ought not to be a state art any more than a state religion. The public, especially in France, is disposed to believe that everything which bears the indorsement of the state is irreproachable. This is a misfortune. It is not for the public to accept standards of taste; it belongs to it to impose them. We ought, then, to give it the means of forming this taste, and nothing more. Give it museums made for study, and not to amuse idle people. Give it good schools, and when it has learned to see and to discriminate, industry will be obliged to supply what suits it. All the attempts which have been made within ten years to improve ceramic art have been made outside of Sèvres. This art has evidently made efforts and sensible progress. Sèvres has nothing to do with it. What, then, is the use of this establishment? To support a certain number of mediocrities, and to manufacture at fabulous prices objects which everywhere in open market go for a price below that of manufacture. Therefore, even the prestige of the establishment does not sustain itself in the public mind. Let them appoint as many commissioners as they will; let them put at the head of the factory at Sèvres, or that of the Gobelins, an artist of high rank; this will not change their principle, which is no longer in accord with our habits.

The state constitutes itself a manufacturer of porcelains, or of tapestry. Tell me, is not this altogether ridiculous, when all the world can manufacture tapestry and porcelain? How then, if these establishments were made to test new processes, and to make experiments with the support of the public revenues, which private persons cannot make? This would be endurable. But no, far from this; these manufactories make it a point to maintain unaltered all their ancient methods, to serve as asylums for routine, and because this is their way we are asked to believe in their superiority. Is not this absurd? These establishments could be maintained under a monarchy because their workshops turned out very costly objects, which the sovereigns of France could offer to their fellows. The things may have been ugly; officially they were the best there was to give. But let us hope that we shall have no more monarchs to make presents. If the Republic wishes to make offerings to its neighbors, nothing is more in character than to address itself to private industry. Here is a veritable stimulant for that (for the industry).

As for ceramics applied to buildings, the English have been beforehand with us, and sell their productions everywhere. We have followed in their wake. Is it Sèvres that has taken the lead? No, it is private manufactories, and already they produce good things. Sèvres undertook one day to make stained windows. She made them detestable from all points of view, both of art and of manufacture. Private industry quickly surpassed her, and Sèvres closed her atelier. This example alone proves that Sèvres can produce nothing, do nothing for progress, and that she is only the refuge of a manufacture which is a thing of routine, costly, and open to attack on the side of taste.

You would have Sèvres give up gimcracks to try high art. Sèvres is impotent by her very organization, from the director down to the fireman. All of them have but one purpose, — to do to-day what they did yesterday, — and if they should lose sight of this object for an instant there would be nothing left for them but to withdraw; for private industry alone has the motives which justify it in departing from the conventional at its own risk and peril. How can you expect a director or even a superintendent to take it upon himself to lose twenty or thirty days, material and time, that is to say, twenty thousand francs or so, for the sake of any experiment whatever? It is a necessity to turn out a production which conforms to tradition and nothing else. Nobody's responsibility allows him to set off on a venture.

Then, in my opinion, there is but one conclusion — *delenda est*, as it is with many other things. Ceramics applied to architecture will take care of itself, and is doing so already, before Sèvres dreams of such a thing. Very truly yours, Viollet-le-Duc.

THE ILLUSTRATIONS.

DESIGN FOR THE WASHINGTON MONUMENT. MR. ALBERT NOERR, ARCHITECT, WASHINGTON, D. C.

THE OLD TOWN-HALL AT MECHLIN.

The *Building News*, from which we copy this illustration, regrets that the draughtsman who contributed the drawing was unable to furnish a description of the building, and we can but do the same.

ALTERATIONS TO A HOUSE AT ———, BY MR. J. P. PUTNAM, ARCHITECT, BOSTON, MASS.

HOUSE OF SAMUEL FARQUHAR, ESQ., NEWTON, MASS. MR. J. H. BESARICK, ARCHITECT, BOSTON, MASS.

CORRESPONDENCE.

NEW WORK. — THEOLOGICAL LIBRARY. — A LAW-SUIT. — THE SPRINGFIELD EXHIBITION. — THE REREDOS OF CHRIST CHURCH.

HARTFORD, CONN.

The building statistics for 1879 show that something over half a million of dollars has been expended in Hartford, for the year, upon all classes of structures, completed works and others yet unfinished.

[1] That there has been great improvement in English art in this respect within the last decade there can be no doubt. The particular garish look that was common to English exhibition-rooms is much modified of late; and French artists remarked on the great general improvement in English art in the Paris Exhibition of last year (1878), compared to what they saw of it in 1867. I was gratified to hear from a French artist of distinction an opinion which is a confirmation of my own, that our art has improved and will continue to improve, because the English take what is good from other schools without sacrificing their originality. He compared it with the art of the Belgian, Italian, and other schools, which can only imitate.

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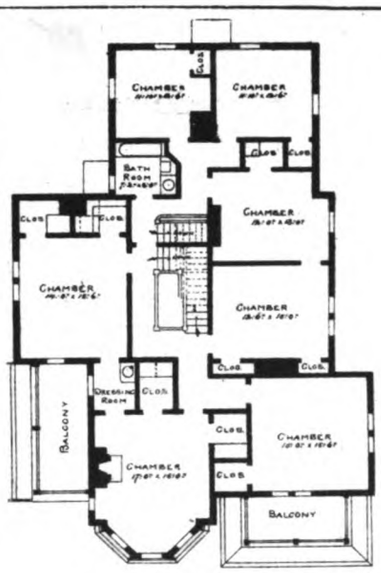
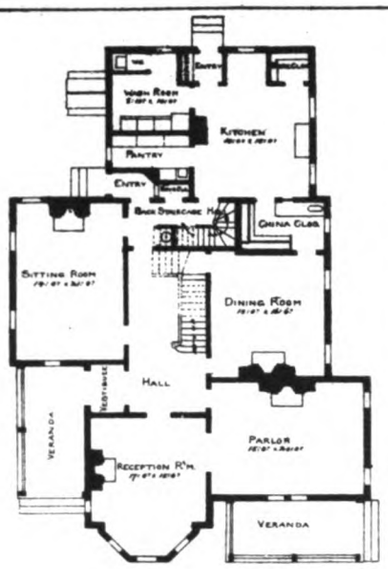


SECOND FLOOR PLAN



FIRST FLOOR PLAN

House for Samuel Farquhar Esq. Sargent St. Newton Mass.

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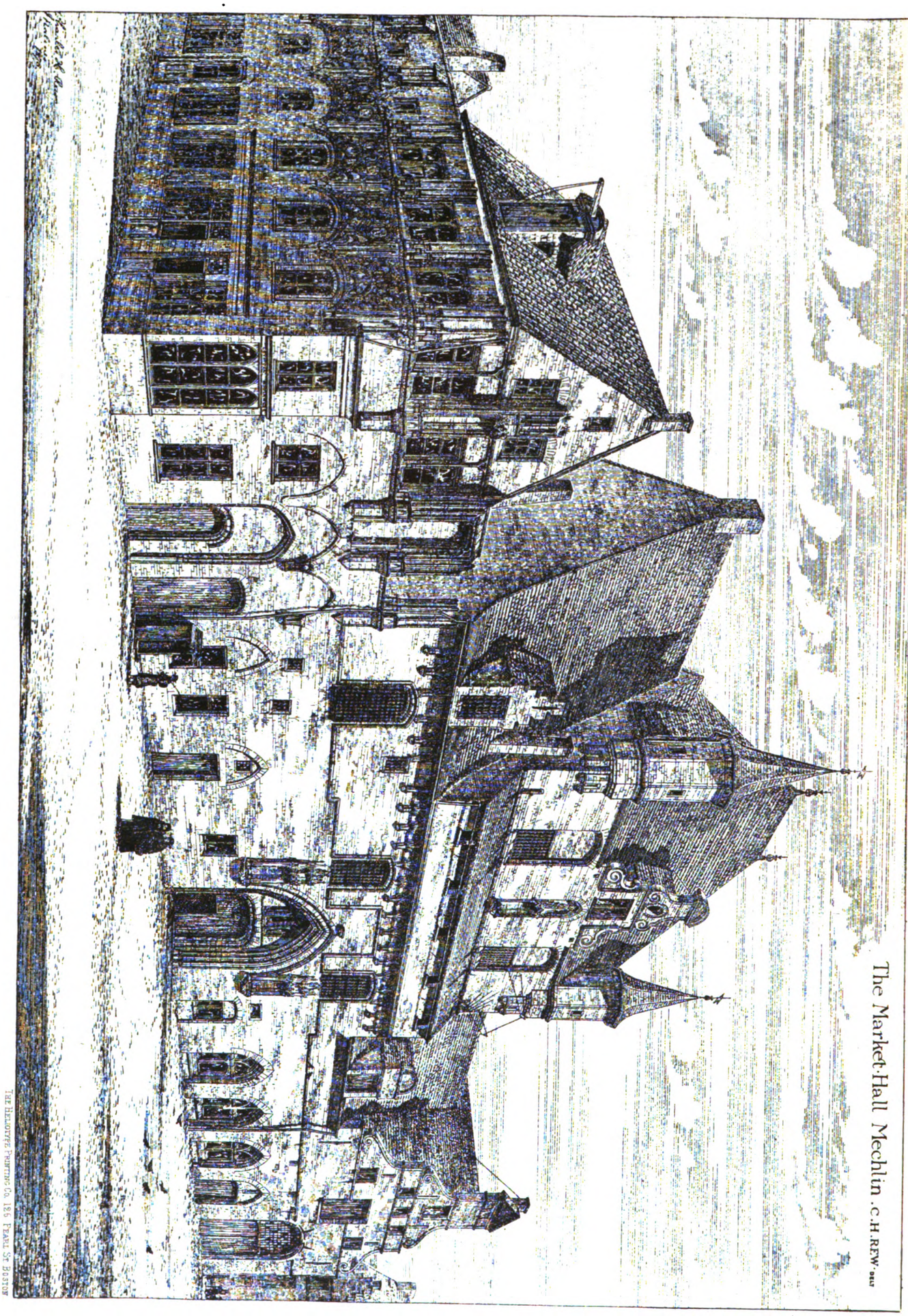

The Market Hall Mechlin. C. H. REW, DEL.

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AMERICAN ARCHITECT AND BUILDING NEWS JAN. 10 1880.

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HOUSE BEFORE ALTERATION

House at ——— after alteration

J. Pickering Putnam, Archt.

Boston. Mass.

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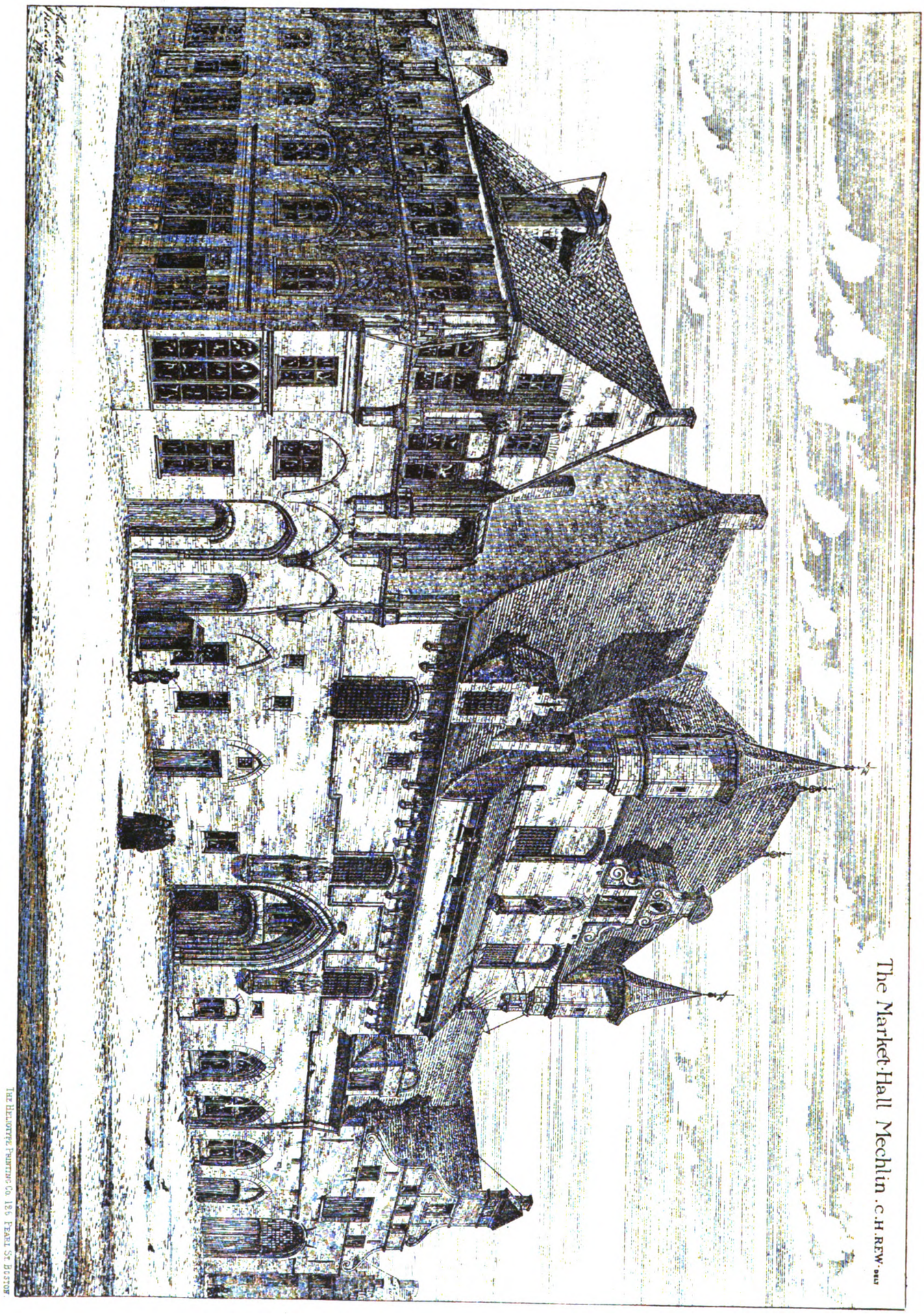

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House at —— after alteration

J. Pickering Putnam, Archt.

Boston, Mass.

HOUSE BEFORE ALTERATION

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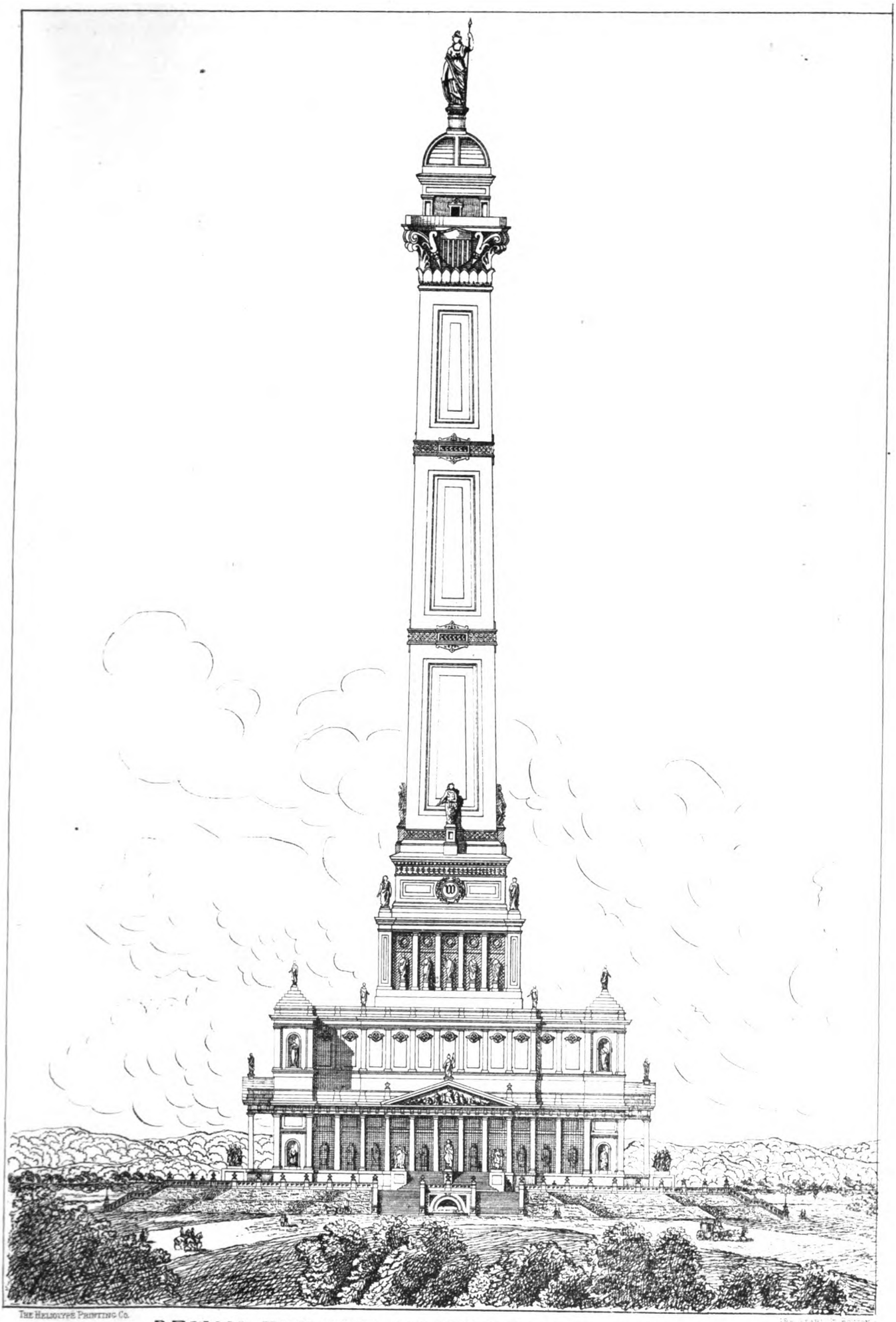

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DESIGN FOR THE WASHINGTON MONUMENT

ALBERT NOERR, ARCHITECT.

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This showing is much better than was anticipated in the earlier part of the year. Among domestic work not before mentioned can be instanced the important additions to the residence of Rev. Francis Goodwin, upon Woodland Street. The house is of brick, and was originally built from plans by W. T. Hallett, architect, of New York, the alterations and additions being carried out from designs by Mr. Goodwin. Exteriorly the additions show the continuation of existing ornamental brickwork, and the harmony of the original structure is preserved. The front of the dwelling has been improved by the addition of a well-designed porch. Beyond the limits of the city, to the west, a wooden house is building from plans by H. J. Hardenburgh, of New York. It almost overlooks the town of West Hartford, and stands well up from the ground upon heavy granite foundations. The building is three stories in height and has a frontage of about forty feet. The front has an effective treatment of pediment, and the construction of the roof is such as to admit of great interior height for chambers in the uppermost story. The ground floor has a central hall, with staircase at the end, and flanking parlors to right and left.

Upon the same road from the city, and within easy driving distance, the house of Cornelius J. Vanderbilt, which is being built by J. C. Mead, of this city, is rapidly progressing. The site is what is known as "Vanderbilt Hill," on which some time ago stood the old house occupied for years by Mr. Vanderbilt. The structure now building is of wood, with brick underpinning upon massive foundations of brown-stone, which were necessitated by the nature of the location. The frontage of the house toward the road is some fifty feet; on this side, as well as on the east and west, extend piazzas of exceptionally ample width. At a prominent and objective angle an octagonal tower some seventy feet high is being built, which will secure an extended view upon all sides. The ground-floor plan shows a wide hall in the centre connecting with a second hall at right angles, in which is the staircase and at the extremity of which is a side entrance to the house. Parlors, twenty by thirty-six, open to the right and left of the main hall, the dining-room being connected at the rear with one of them, and the entrance being from the large hall. The chamber floor gives most ample room. A portion of the house lately occupying the site will form a part of the L of the new structure. The interior will be handsomely finished in woods.

The Connecticut Theological Seminary, whose "tinkered" architecture was mentioned in a former letter, has extended its brick and mortar territory by the erection of a library. It comes under the head of semi-detached buildings, and being so closely allied to the main structure it has imbibed, or to speak with temperance, has been imbued with, the same notions in respect to architectural effect which are thrust upon the public by its more ambitious and lofty companion. It can be truthfully described by one of those comprehensive generalities which announce that "it is in keeping with the general design." It is. A stone porch has just been finished at the main entrance.

Architecture and the law have again embraced each other. As the decision of the case was peculiar, for one side at least, it may afford a note of interest to the readers of the *American Architect*, and the gist of the affair can be briefly stated as follows: A was employed by B to prepare and submit sketches and plans for a small brick dwelling to be built in this city, both parties being residents of Hartford. A sum for furnishing necessary drawings to complete the structure was agreed upon by A and B, the amount being so absurdly meagre that for the sake of architectural posterity it shall not be mentioned here. This amount was doubled by B, with the understanding that the combined fees should insure superintendance by the architect. A, who was pressed for time, agreed with C, a draughtsman, to assist him with the sketches and plans, for a certain amount of money, his duties under the agreement not to extend to detail-work. A small sum was offered for one or two special detail drawings. The work was carried out to completion, and the money received by C in two payments. C performed a large amount of service, as shown by drawings of various scales and full-sizes, beyond the stipulations of agreement, for which he sent — some time after the expiration of the labor — a bill; and payment not being forthcoming a suit ensued. It should be stated that the majority of the drawings were executed at night in the residence of A. The case was tried in the court of common pleas, and judgment was rendered in favor of the defendant A. During the progress of the suit several local architects were put upon the stand to testify, as experts, to the worth of the drawings made by the plaintiff, and one point was strongly illustrated in their testimony, namely, the real value of architectural service; the bill upon which the suit was based being in no instance greater than the worth adjudged by the experts, and in some cases falling below it. The meagre amount of the architect's fees, before referred to as covering the cost of professional service, coincided nearly with that of the plaintiff's bill. The decision of the case, unlike that which we once chronicled of a suit for estimating, brought against Trinity College in this city, did not seem to rest upon the fact that unremunerated labor had been performed, but that the sums promised by the defendant to the plaintiff for work were duly paid, and therefore it would appear that the obligations of the defendant were at rest. There seems to have been no consideration of the fact that work over and above the value of that performed for the stipulated sum was done by the plaintiff. This, however, was the case, and the work comprehended numerous full-sizes, which were not only drawn, but designed, by the draughtsman, and formed the major part of the basis of the bill rendered. The decision of the Trinity College suit excited no little comment, as it was at variance with all precedent theretofore existing in relation to payment for estimates upon contemplated work, while the judgment rendered in the above suit — which was of itself a comparatively small matter — is equally surprising, as it presents the public with opposite views of the value of services rendered by one party to another.

The formation of art associations in the smaller cities, with the natural desire of their members for exhibitions to illustrate their progress in the arts, as well as to stimulate public taste, led to the announcement of an art exhibition at Springfield, Mass., which was duly opened by the association of that city during the past month. The organization was incorporated a year ago, and opened schools, which have been well attended, in the various branches of art. The exhibition, which was the first public one given, lasted five days, and was, all things considered, a success. Beside the exhibits of members, valuable contributions to all the departments were sent in from various parts of New England as well as from New York. The loans of paintings and water-colors from the latter city lending infinite attraction to the galleries.

The architectural exhibit in a separate room was largely representative of Boston, well-known architects contributing, as well as the architectural department of the Institute of Technology. There was a generous exhibition of drawings by local architects, in which Messrs. Ferry & Gardner figured conspicuously, the designs for the new *Republican* offices being among their contributions. Hartford architects were represented by Mr. Keller and by Mr. Brocklesby, each of whom exhibited several designs. The drawings were mostly line drawings, although there was a goodly sprinkling of water-colors, and the subjects embraced many departments of architecture and all classes of buildings from churches to the humblest country house. Messrs. Ware & Van Brunt exhibited a town-hall design, a collegiate building, together with their competitive design for Trinity Church, Boston, including sections, elevations, etc. Messrs. Peabody & Stearns showed the admirably executed sketches for a country house lately reproduced in the *American Architect*, a design for a bank building, a library, and several others worthy of note. Two or three interiors, by W. W. Lewis, and also some cottages by the same architect, were readily recognized. From Providence Messrs. Walker & Gould sent a view of a high-school design. Three designs for houses were contributed by H. F. Kilburn of New York. The Institute of Technology was represented by about a dozen designs, mounted and framed and chiefly finished in color, academies, museums, railroad stations, and town-halls being among the number. Another addition to the general exhibit was that of the author architect, E. C. Gardner, who sent in a perspective and plans of Dr. Holland's country house, the plans of which were elaborately "detailed," even to the representation of the luxurious hearth-rug. A highly interesting department of the exhibition was that in which magazine illustrations were shown, as it afforded views of the original sketches by popular artists in this specialty, among whom are F. S. Church, J. E. Kelley, and others.

Boston bore off the palm in embroidery and needle-work, but was not as successful in china painting. The embroidery referred to was a pair of curtains, of thoroughly well-conceived design and most excellent workmanship, by the pupils of the Boston Embroidery School. The Household Art Company sent a tiled fireplace, and the Chelsea Pottery Works were well represented by several good specimens both in color and in design.

The writer may be pardoned another mention of the alterations and additions to Christ Church, Hartford, to chronicle the completion of the work, and to say a word touching the beauty both of design and of workmanship which characterizes the whole. The new chancel was consecrated and the chapel dedicated two weeks ago, at which time the semi-centennial of the consecration of the present church was celebrated. The chancel has a depth of sixteen feet, and is twenty feet wide; it is raised seven steps above the church floor and is tiled, the upper steps being of brown-stone. The rear wall is pierced by a lofty window filled with stained glass; the subject is the Transfiguration, and the window contains six large figures, the tracery lights bearing ecclesiastical emblems. The window is by Heaton, Butler & Bayne, of London. The chancel arch is of Ohio-stone, about forty feet high, the face bearing columns upon carved heads. The chancel contains a fine reredos in Perpendicular Gothic corresponding with the design of the church. It is of Caen-stone, and enriched with exquisite carving; the central bay is recessed and bears in relief, upon a diapered face, a cross with the Holy Dove above; the two side bays are elaborately panelled. The height of the pinnacled buttresses — which form the division of the bays — is nearly thirteen feet. The altar table, the pulpit, and the prayer-desk are of oak, characteristically enriched, and rendered extremely beautiful by carving. The chancel rail is of oak with polished brass standards; the credence, which is built into one of the chancel walls, is of carved stone. Taken as a whole, and viewed from an architectural standpoint, this work of Mr. Withers is by far the best ecclesiastical design of which Hartford can boast. The parish building, just completed, is well adapted to its various uses, and is a substantial structure of stone. The interior is handsomely finished in hard woods in their natural color; the windows throughout have leaded sashes filled with rich cathedral glass.

CHETWOOD.

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THE LATE M. DENUELLE.

M. Dominique-Alexandre Denuelle, father-in-law of M. Taine, who died recently in Paris, was one of the most eminent decorative artists of the day. He was born in 1818. He was the son of a prominent manufacturer of porcelain, and in early life mastered the details of this pursuit. Having a taste for decorative art, however, he abandoned this occupation, and pursued his studies to that end, first in the studio of Duban, and afterward in that of Paul Delaroche. In 1842 M. Denuelle went to Italy, where he made studies of Italian monuments, which, on being exhibited in Paris, obtained for him a gold medal. In 1844 he was appointed on the Board of Commissioners of Historic Monuments, and at the same time decorator of the churches of Paris, his first work being the choir of the fine old church of St. Germain des Prés. In addition to the above may be mentioned, among the most conspicuous, the churches of Sainte Clothilde, Trinité, St. François Xavier, several chapels in St. Sulpice and St. Eustache, and, near Paris, the Abbey of St. Denis. Beside these churches, M. Denuelle's work may be found in the great cathedrals of Rheims, Amiens, Bordeaux, Beauvais, Orleans, Tours, and Avignon. Beside his work on religious edifices, M. Denuelle executed decorations in the most remarkable of the national and municipal structures of the country, together with many private hotels. Of these there is a long list. The most important are the Hôtel-de-Ville and Exchange at Lyons; the Château at Blois; the Prefecture, Museum, and Library at Grenoble; the Château at Maintenon ; and various mansions belonging to the Dukes of Padua, La Rochefoucauld, and other great proprietors, including those of prominent bankers and manufacturers, such as Schneider, Pereire, Millaud Denière, etc. In Paris, his most remarkable works were the new apartments of the Louvre, the Palais de Justice, the Tribunal de Commerce, the Musée de Cluny, etc. Chief among his works, however, on which he has been engaged for the last two years, is the decoration of the Cathedral of Strasburg, which was to have been executed with Flandrin many years ago, but which, stopped by the death of that artist, has only been resumed since the Franco-German war, under the old contract with that town.

M. Denuelle acquired the highest honors of his profession, being the recipient of many medals, and occupying important posts on government commissions. Many of his works relate to the preservation of ancient mural paintings in buildings like the Cathedral of Avignon, a large number of his designs being published in the National Collection of Historic Monuments. He was recently appointed on the commission to examine into the condition of the Gobelins, the able report thereon being made by him.

Apart from his qualifications as an artist, M. Denuelle was esteemed for his personal qualities. Among his professional brethren, the leading architects and painters of Paris, he was especially cherished. His most valued friendships in this circle among the dead consist of Flandrin and Gleyre, of which latter artist he possessed many admirable works. He was likewise a friend and companion of Prosper Mérimée. M. Denuelle, beside the qualities which endeared him to his family circle, was the type of an artist and likewise of his countrymen. Of an impulsive temperament, regarding everything from an artistic point of view, ardent and devoted to his work, gay, full of enthusiasm when his tastes and sympathies were excited, and, although a grandfather, as youthful in his feelings as a boy, he is a striking example of French character.

M. Denuelle enjoyed an ample fortune, the fruit of his labor, and was eminently social and hospitable. He entertained largely, the weekly gatherings at his house during the winter being as enjoyable as any in Paris. At his home might be found the most celebrated literati, architects, and painters of the day. — *Evening Post.*

THE THEATRE WAR AT LYONS.

An instance of Yankee-like push and disregard of tradition and *les convenances* has just occurred at Lyons, France, which has caused so much excitement in the city that the citizens are said to be actually divided into factions, one side supporting the innovators, and the other side supporting the existing state of things. The Continental system of subsidizing theatres with government appropriations is nowhere so generally practised as in France, where the theatres are regarded, even now that the country is a republic, as important political engines in governing the excitable people by furnishing them with occupation for their time and subjects for their talk. This national custom has been followed hitherto in Lyons, where the two theatres, Le Grand Théâtre, which can seat twenty-two hundred persons, and Le Théâtre des Célestins, which can seat seventeen hundred, receive together a government subvention amounting to thirty thousand dollars a year. At these theatres the best standard plays are produced, together with a fair number of new plays, yet their combined receipts can amount to but fourteen hundred dollars a night. Besides these two large theatres there are a number of smaller theatres where vaudevilles and lighter pieces are produced.

In spite of this somewhat discouraging prospect, a body of capitalists have been encouraged to build a new theatre, larger than the largest of the existing theatres, one which can seat twenty-four hundred persons, and give standing-room to six hundred more, and have entrusted the work to M. Jules Chatron, architect, to carry out. M. Chatron has understood that in order to compete with the subsidized theatres, it was necessary that it should be both built and conducted on a basis essentially different from those on which the older theatres were carried on. The difference in the conduct of the new theatre has been effected by adopting the American system of employing star companies, who play short engagements, while the older theatres depend on their regular stock companies; but this innovation has been met by the older theatres by increasing the number and variety of plays put upon the boards. Thus during six weeks Le Théâtre des Célestins played twenty-two different pieces, while the new theatre, Le Théâtre de Bellecour, played only two.

The difference in the theatre building itself, which was, of course, to be the peculiar care of M. Chatron, has been effected by various striking changes in arrangement and innovations on the conventional treatment of theatres, the real object of which was to create a sensation, which are described by a correspondent of the *Builder* as follows: —

The façade is perhaps the part of the building which occasioned the most perplexity, and gave the architect the best opportunity of displaying his ingenuity. The company, or rather the few shareholders to whom this theatre belongs, succeeded in obtaining a site measuring more than 2,000 square metres, and valued at more than £40,000; but the portion of this land which gives on to the main thoroughfare of Lyons, the Rue de la République, close to the Place Bellecour, is extremely narrow. To add to the complication, the houses on either side do not match, the one is much larger than the other, and they are in no way adapted to the close proximity of a great public building. How far the architect, M. Jules Chatron, has made the best of these adverse circumstances must remain a matter of opinion; but, in every case, no one can deny that the façade of the theatre, in spite of its narrow dimensions, is at once imposing and original. The entrance is flanked by two immense statues, eighteen feet high, which are surmounted by a balcony, corbelled out in hard limestone. Above the balcony there is a monumental loggia, decorated with mosaics, bronze, gold, stained glass, etc. One of the peculiarities of this theatre is that there are three *foyers*, or crush-rooms, one above another, to correspond with each story, and all giving on to the street. The two upper crush-rooms are not yet furnished. Over the loggia there is a cupola, painted to imitate Florentine bronze, and relieved with gilding. This enables the eye to realize the height of the structure. Behind the cupola similar windows admit light into the body of the theatre in sufficient quantity for a meeting or concert to be held in the daytime without the aid of gas. Finally, on the summit of all, an electric light indicates to the whole town that the theatre is open, — the piece begun.

The side of the theatre giving on the Rue Bellecordière has a wall no less than one metre fifty centimetres thick, and thirty-seven metres high. This wall is united to the rest of the structure by tension-rods and enormous rafters in iron; fixed at their extremities in metallic pillars, and possessing, according to the verdict of the experts appointed to examine the safety of the building, every necessary element of strength and security.

It is impossible to enter, be it only the vestibule of the theatre, without being at once impressed with the novelty of the entire organization and structure. First of all that abomination of the French theatre, the *queue*, has been abolished. Instead of being obliged to stand packed close together in Indian file between palisades that look like cages in front of the ticket-office, the public is allowed to secure places at any time during the day without extra charge. Every place in the theatre is numbered, and thus, armed with his ticket, the spectator can walk in at any time, without being compelled to wait outside before the doors are open in order to secure a good place. This is certainly an excellent innovation, and avoids much confusion and crowding.

The entrance, or vestibule, leads to the most peculiar part of the theatre. This is termed the Indian café, which, built underneath the theatre, is circular in shape and entirely lighted, both day and night, by electricity. It would be most difficult to give anything approaching to a correct picture of this most fantastic place. The style of decoration is purely Indian, and not a little barbarous. Brick-red is the predominating color, but this is relieved with gold, green, blue, Indian faces painted here and there, and a little black. There is a colonnade all round, with red and gold pillars, while the wall beyond the pillars is covered with uneven looking-glass, that seem more like plaques of polished steel, fixed into a buff-colored frame-work. The pillars have for capitals elephants' heads, life-size, painted a dull green, with huge gold ears. There is a circular bar in the centre whence refreshments are served, — little tables dotted here and there for coffee, etc. The absence of gas and the tesselated pavement would render the place delightfully cool in summer, particularly as drapery is used instead of doors. The whole effect is harmonious, though it might be thought gaudy but for the fact that the high coloring is in keeping with the Indian style. In any case the result is most startling: the electric light throws a fairy like glamour on the scene, and it would be worth while visiting the theatre if only to see the café.

Below the café — that is, in the basement — another circular room, plainly decorated and not so lofty, serves as a restaurant, so that the visitor begins by dining in the room below the level of the earth, then ascends to the ground floor, where he takes his *demi-tasse*

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and cigar, and finally, at the last moment, when the electric bell has given the signal, he goes up to the first floor and finds that his stall, numbered and reserved, is ready, waiting for him. The theatre itself is also a remarkable though less eccentric structure. Its size and importance may be gathered from the fact that it will seat 2,400 persons, though the seats are separated by divisions, to prevent overcrowding; and, further, there is standing room for 600 more persons. In the general style, M. Chatron has sought to effect a happy compromise between the Italian and French systems. In the ordinary French theatre each category of place varies in aspect and disposition. The first tier of boxes and the dress-circles predominate by their sumptuous decoration. In the Italian theatre, on the contrary, the decorations are uniform, whatever the height or nature of the place they surround. At the Théâtre de Bellecour a difference is made, but not so marked as is generally the case in France. Each row of stalls is raised one above another, so that the persons in the last seats can see perfectly; but the floor is level, the seats can be easily removed, and the theatre converted into a large ball-room. Around the stalls and on the same level there are thirty *baignores*, or large boxes, which hold eight people, and are only separated from each other by a division about three feet high. Behind these there is not, as in most theatres, a wall, but simply some heavy drapery; and, on the other side of the drapery, a wide space where persons can stroll round and talk, and, by pulling the curtains aside, obtain an occasional glimpse at the stage. To this contrivance, however, two very serious objections may be made: firstly, the sound of conversation disturbs those who are seeking to enjoy the play; while the rush of wind every time the curtains are moved is most distressing, at least in the cold weather which so often prevails at Lyons.

The general disposition of the interior of the theatre is very similar to that of the ancient Paris Opéra, in the Rue Lepelletier. There are four columns on either side of the stage, of a composite and remarkable style. The three galleries are richly decorated, the design including shields that bear the names of great composers and authors. The centre of the ceiling represents the rays of a star, to which the eight electric lights that hang underneath, instead of the ordinary gas lustre, give an appearance of reality. The rays of the star gradually lose themselves in clouds, which themselves frame allegorical and admirable paintings, representing Aurora opening the gates of the West to Apollo conducting the sun; and, where darkness of night still prevails, Tragedy and Death are menacing Love, nurtured in the soft glow of the dawning day. There is also a stalwart female, seated on a heraldic lion, receiving a crown from the hands of Renown, which is, of course, meant to represent the town of Lyons. Round the galleries we have both electric and the ordinary gas light. These are used sometimes simultaneously, sometimes separately, according to the exigencies of the play. In the decoration the most novel feature is the frequent admixture of red copper, which harmonizes wonderfully with the surrounding gold and silver, and with the rich crimson satin hangings and gold fringe.

The first floor or principal crush-room is preceded by a regular English bar, with three bar-girls, who have thoroughly understood the importance of personal appearance as a means of increasing the sale of refreshments. The crush-room is also Indian in style. The walls are covered with looking-glasses, framed in pillars, which, facing each other, give the room the appearance of an endless gallery, where the waving palm-leaves, poised above the central seat, are reproduced over and over again. The pillars are of a brick-red color. The room is lighted by electricity, which has a most curious effect of color on the large satin rosettes that surmount the doors. These are made of plaited blue and crimson satin, with red velvet and gold fringe.

The challenge which has thus been flung at the official theatres has been taken up by them in good earnest, and they have not only increased the number, variety, and excellence of their performances, but the official subvention has been doubled, and a large sum is to be spent in furbishing up their decorations, and making desirable alterations in their arrangements.

THE GREAT CHANOINE DAM AT PITTSBURGH.

THE General Government is at present engaged in constructing, near Pittsburgh, Pa., an experimental lock and dam, which, when completed, will be among the largest works of the kind in the world. The dam will be the largest "movable" one yet built in this country, being designed after the Chanoine system in use in the Seine and other European streams. The object of the work is mainly to test the applicability of the Chanoine system to the improvement of the Ohio and similar streams. The success or failure of this costly experiment will have a most important bearing upon the future of the entire Ohio Valley from Pittsburgh to Cairo, Ill., and more particularly upon the coal trade of the first-named city.

The lock gates are unlike those in general use in every particular. They are immense affairs. In operation they will run directly across the lock at right angles to either wall. To enable them to be so operated immense recesses lead from the shore wall, each recess being 120 feet deep (long) and 15 feet wide. Into these the gates slide when the lock is opened. Each gate measures 118 feet in length, 10½ feet in thickness, and 14 feet in height; and these affairs will resemble, in place, a truss bridge on edge. Their material will be wood or iron. If of the former, they will weigh 80 tons each. An offset in the masonry of the river wall serves as bearings for the outer end of each gate. The operating device for these ponderous gates will be turbine wheels, actuating upright and lateral shafting, so arranged in connection with suitable gearing, endless screw, reversing device, etc., as to draw the gate in and out of its recess upon seven pairs of iron rollers running upon rails. The latter are laid on the masonry at the bottom of each recess and across either end of the lock. Connecting the bottom of the upper recess with the bottom of the shore side of the lock is an immense arched tunnel termed the "filling culvert." Into it the water pours from seven circular inlets, 4½ feet in diameter, and fitted with balanced wing valves or gates, and is led to the lock, which is filled through ten openings, 3 by 3½ feet, and seventeen feet below the coping. By this means the lock can be filled or emptied in four minutes.

The dam will be 1,200 feet long, subdivided into three "passes" of 400 feet each. The channel pass, or that nearest the lock, will be that across which the movable or Chanoine dam will be placed. A solid sill of masonry and timber must first be laid across the bed of the river. To the timber is hinged a series of wickets of stout oaken planks, each thirteen feet in length by three feet eight inches in width. A space of four inches separates the wickets, and a hinged prop or arm forms part of the wicket, the whole being so arranged that when the wicket is drawn to a position almost perpendicular, its prop, as to its free end, slides into a metal "step." This operation repeated constitutes raising the dam, inasmuch as every wicket is a duplicate of its neighbor. Lowering the wickets is instantaneously accomplished by means of a "tripping bar" extending along the series and resting upon the dam sill. By its agency each prop is disengaged from its "step," the water presses wicket and prop prone upon the bottom, and the channel is virtually clear of obstructions. The spaces mentioned as existing between the wickets are thus provided for: Over each interval a plank is laid, kept in place mainly by the pressure of water upon its upper surface. These planks are connected by links at their upper ends only, in such a way that when the dam is "tripped," the chain of planks, being connected, and the whole series being permanently fast at one end only, swings away with the current — a sort of floating chain, ready for service again when the dam is raised.

Such, in brief, are the devices constituting the main features of the Chanoine dam, which will rise and fall — according to the stage of water — across the channel of the Ohio at the point in question. When the river falls to less than a six-foot stage the wickets will be raised by gangs of men in boats working simultaneously toward the centre of the pass. When up, the crest of the dam will be twelve feet above the sill, and the "back water" will extend into the mouths of both the Alleghany and Monongahela Rivers. This, of course, means navigable water about the wharves of Pittsburgh and her sister city, Allegheny. At present, local towage is only possible during a portion of the year. — *Scientific American.*

A NOVEL RAILROAD.

MR. JESSE FRYE, a mechanical engineer in New York city, has on exhibition the working model of a novel railroad. Each wheel consists of a lesser and larger wheel, the smaller one resembling the hub of an ordinary wheel. The two are cast in one piece, the hub projecting inwards and being one fourth of the entire diameter of the wheel. The hub moves along the track by means of any power, and the large wheel, of course, moves with it, but entirely free of the track. A block of wood representing a car and having grooves on the under surface is fitted on to the larger circumference of two pairs of wheels; the track being double like an ordinary railroad track, and power being applied to pins in the axles, the car moves along at a rate of speed four times greater than the speed of the hub, and passes rapidly from one set of wheels to another. In other words, while all the wheels, which are in the form of an endless chain, move one foot, the car moves four feet, the motion originating in the hub, and being transmitted to the car through the larger wheel. It is designed to operate this system in an iron tunnel elaborately constructed in small sections and fitted together so closely as to be impervious to water and gases, the tunnel to be placed under ground or under waterways at any required depth. Within the tunnel are to be two compartments or avenues for two trains moving in opposite directions. The compartments will be just large enough to allow the trains to move easily, and the road or tunnel is to be somewhat in the form of a flattened ellipse, forming a circuit, the train being continuous and having neither beginning nor end. Thus a person going in one direction and remaining in a car would after a time find himself at the place from which he started. Mr. Frye claims that the close fitting of the trains in the compartments will overcome very greatly the resistance of the air, and so enable a high rate of speed to be maintained without loss of power. He also claims that axle friction is entirely done away with by his plan, and thus so much additional power gained. The compartments will be ventilated by stacks running up through the tunnel to the outer air. The steam engines are to be placed beneath the tunnel, one engine to operate a circuit. It is proposed to build the tunnel not by excavation but by burrowing or boring, thus obviating all damage to property on the surface. The cars will be coupled by means of a universal joint. Mr. Frye claims that by his system a speed of one hundred and fifty miles an hour can be attained. — *Exchange.*

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PUBLICATIONS RECEIVED.

Specifications and Schedule of Material for the Steam Heating and Ventilating Apparatus at the New Iowa State Capitol at Des Moines, Iowa, by order of the Board of Commissioners. Des Moines, 1879.

NOTES AND CLIPPINGS.

Fall of a Building. — The old Sweet Gum Hotel, at Mound City, collapsed and fell in on the occupants at 8 o'clock in the evening of December 29, killing two children and fatally injuring another child and a woman named Williams. It stood close to the Marine Ways, and was a large two-story frame house that was occupied during and soon after the war as a hotel and boarding-house.

The Fire Loss for 1879 in Philadelphia. — The report of the chief clerk of the Fire Department shows that from January 1 to December 30, last year, the total number of fires occurring in the city was 739, nine less than in 1878, the largest number occurring in July, when 101 were reported. Among the largest were John Brown & Sons' mill, Eighth and Tasker Streets, January 20, loss $180,000; Washington Butcher's Sons, March 24, 146 and 148 North Front Street, loss $31,156; the fire at Crown, Fourth, and Rice Streets, April 6, loss $391,439; the Point Breeze Oil Refineries, June 11, loss $1,000,000; the grain warehouse on Market Street, west of Seventeenth, November 1, loss $150,000; Megargee's paper warehouse, Sixth Street, above Chestnut, December, loss $350,000; and the Oxford Presbyterian Church, Broad and Oxford Streets, December 3, loss $50,000. The losses and insurances during the different months of 1879 and the previous year were as follows: —

	1879.		1878.	
	Loss.	Ins.	Loss.	Ins.
January,	$187,826	$542,475	$511,044	$2,274,550
February,	34,686	323,517	14,346	180,099
March,	78,008	930,355	367,781	1,143,386
April,	402.144	1,213,940	21,292	197,850
May,	35,914	321,225	89,867	350,973
June,	62,618	204,525	31,291	357,000
July,	60,776	475,792	13,658	290,350
August,	8,866	169,100	46,818	375,500
September,	21,001	260,525	23,132	443,107
October,	43,072	250,700	40,289	376,135
November,	200.000	300,000	297,000	247,000
December,	400,000	350,000	70,000	275,030
Totals,	$1,534,911	$5,342,154	$1,526,518	$7,510,950

The United States at the Australian Exhibition. — The Secretary of State, desiring to secure a good exhibition of American goods at the Melbourne International Exhibition, to be opened October 1, 1880, has appointed Thomas R. Pickering, of Connecticut, an agent on behalf of the United States Government to solicit exhibits. Mr. Pickering has opened an office in Post Office Building, New York city.

Storm on the Isthmus of Panama. — After the rain-storm on the Isthmus, late in November, the bed of the Panama Railroad was five or six feet under water, with the exception of the first section from Panama for a distance of eight miles. For nine days rain fell continuously. The road was washed away in many places, and the iron bridges across the smaller streams were bent and twisted by the force of the torrents. The superintendent crossed the Isthmus from ocean to ocean in a small boat while engaged in directing the repairs.

Death of Ittenbach. — Professor Franz Ittenbach, a religious painter and contemporary of Professor Carl Müller, died in Dusseldorf, in the early part of the month, in his sixty-sixth year, having been born at Königswinter in 1813. He was attached to the Dusseldorf Academy of Fine Arts, and was a pupil of Professor von Schadow. After travelling in Italy, he on his return to Germany executed some frescoes in the Rhine Church at Reinigen. One of these has for its subject Christ and the Doctors. His Holy Family in Egypt is in the Berlin National Gallery. A number of his works are in this country. Colonel Thomas A. Scott, of Philadelphia, owns his Die Himmels Koenigin. His Madonna and Child belongs to Mr. Edward Mathews, of New York, and his Holy Family, which was in the H. N. Smith sale here a few years ago, is owned in Philadelphia. Professor Ittenbach was a Catholic and a deeply religious man. His works are distinguished by much sentiment and religious feeling, and are rich in color. Two years before his death he became blind, but an operation restored sight to one eye. He was a chevalier of the Order of the Prussian Crown and of the Order of Leopold of Belgium, and a member of the Viennese Academy of Fine Arts.

Death of Hübner. — The death is announced from Dusseldorf, on the 5th inst., of Professor Karl Wilhelm Hübner, a well-known German genre painter. He was professor at the Dusseldorf Academy of Fine Arts, and in his sixty-fifth year. Born at Königsberg and the son of a poor laborer, he on leaving school, having shown a taste for art, became a pupil of J. Wolf, a portrait painter, who had a short time before left David's studio, in Paris. In 1837 he became a pupil of Karl Sohn, at the Dusseldorf Academy, and afterward of M. von Schadow. Large numbers — in fact, nearly all — of his pictures are in this country, and at one time commanded high prices. Professor Hübner visited America — where he has two sons, one of whom is in business in New York — in 1875. Another son, Julius Hübner, who died some four or five years ago, followed his father's profession. Professor Hübner was a chevalier of the Order of Leopold, which decoration he obtained when his The Rescue from the Flames was exhibited in Brussels, in 1854, and of other orders, and was a member of the academies of Amsterdam and Philadelphia. He was made professor in 1864, was very industrious, and produced many works which are noticeable chiefly for the stories they tell and their composition.

The Bed of the Tiber. — The enormous supply of lead needed in the water system of Rome for the daily distribution of a milliard seven hundred millions of litres came from English mines. The business belonged to the imperial fisc. Many masses of lead have been discovered in the sea-ports of Great Britain ready for shipment; one has been traced half-way on the coast to Spain, but none had been discovered in Rome. One has now been found at the bottom of the Tiber, fallen overboard in the moment of landing. It is sixty-four centimetres long, thirty-two wide, nineteen thick, and has the many stamps from the officers of the fisc, as well as the weight engraved. The weight is DCCCLXX, or eight hundred and seventy pounds.

A New Temple Bar. — At a meeting of the Court of Common Council, held December 10, the City Lands Committee submitted for the approval of the court the model of a design for marking the boundary of the city's jurisdiction on the site of Temple Bar. In their report they stated that the structure would also provide a rest for foot-passengers crossing from the New Law Courts, sixteen feet being left on each side for vehicular traffic. It is stated that the extreme height will be thirty-three feet, the material to be used in the construction being either a hard white stone, or an equally durable and fine-grained material capable of withstanding the weather. The base and pedestals are to be made of gray or other granite, whilst the statues, which it is proposed should be of heroic size as well as the surmounting griffin, will be of bronze. The report was adopted *nem. con.* Mr. Bedford then moved: "That the Right Honorable the Lord Mayor be requested to take the necessary steps for obtaining Her Majesty's pleasure with reference to some important details connected with the proposed design." This also was agreed to unanimously. — *London Telegraph.*

A New Statue of Prometheus. — The *Academy* states that the Berlin National Museum has just been enriched by what is declared to be the largest modern group of sculpture extant. The artist is Professor Gustav Muller, of Coburg, a sculptor long resident at Rome, who has been engaged upon this work for eleven years. It is a Prometheus group, representing the bound Titan at the moment when the eagle first pierces his body with his claws, while two Oceanides, beautiful nude female figures, endeavor to loosen his chains. The one tries to ward off the bird, the other sinks down overcome with horror. The conception and execution are said to be very fine, and the figures, especially the female ones, are highly praised. The whole group is modelled out of one block of the finest and purest Carrara marble, weighing three hundredweight, which its owner regarded as such a unique mass that it was with difficulty that he was persuaded to part with it. With the exception of the very roughest outline, the execution of the group is entirely from Professor Muller's own hand.

The Walls of Nuremberg. — Nuremberg, in spite of many protests, has at last decreed that her wonderfully interesting old wall with its many towers must come down, to give the city a chance to grow. Rumors of plans to do this work have been current for some time, and there seems now to be no doubt of their melancholy truth.

To Remove Old Paint. — A writer to the *English Mechanic* says: The cheapest and best solution that I know of I accidentally discovered, and it may be worth while to tell how, though very likely some may know of it. In trying experiments for press-copying some old letters, amongst others I used successfully a solution of one table-spoonful of vinegar and one ounce of washing soda to a half pint of water. A little of this was spilt on the painted window-sill, and in wiping it up the paint came entirely off, leaving the bare board quite clean. Try it; a gallon will not cost fifty cents.

Annealed Glass. — Attention is called in the *English Mechanic* to a curious fact connected with the ordinary bottle glass, namely, that if it be cooled slowly, it may lose its vitreous properties, and be changed into what is called Réaumur's porcelain — an opaque and milk-white substance much resembling porcelain in appearance. To produce this change, the glass may be imbedded in sand and heated so as to soften it, but not sufficiently to fuse; if now it be cooled very slowly, it will be found to resemble porcelain in appearance, and to be considerably harder than the other glass. This interesting change is probably due to the partial separation of some of the silicates, especially those of lime and alumina, and their assumption of a crystalline form. This is a familiar fact, which may frequently be noticed in glass-works.

Floods of the Tiber. — Castiglione enumerates no fewer than thirty-six great floods of the Tiber between the birth of Romulus and the year 1598. The picturesque Ponte Rotto still bears witness to the fury of the inundation which in that year, beginning on the 25th of December, made the Roman Christmas a feast of despair. Its violence is attested to by the highest of the tablets affixed to the outer wall of the Church of Santa Maria sopra Minerva, — the church, by the way, which was assigned to the Archbishop of New York with his Cardinalitian title. Yet neither in 1598 nor in 1557 nor in 1530, all of them disastrous dates in the municipal annals of Rome, did the waters rage more perilously than in 1870. They began to rise seriously in that year on December 26, and in three days attained their greatest height. For many days before the 26th, however, the clouds had been dense and the rainfall heavy along the whole upper course of the Tiber. At midnight on the 26th a clap of thunder shook the houses near the Ponte St. Angelo like an earthquake, and a picture was struck by lightning over an altar in the Vatican. During the inundation the post-office was closed for nearly sixty hours, and for two nights the city was in darkness through the suspension of the gas-works. It was in the midst of the desolation caused by this calamity that King Victor, on the 31st of December, for the first time entered the new capital of his crowned and completed kingdom of Italy. — *N. Y. World.*

Commemorative Monuments in Italy. — A hundred and thirteen commemorative monuments have, within the past twenty years, been erected in various parts of Italy to its great poets, scientists, philosophers, and artists of the past, and to the statesmen and warriors who aided in Italian unification.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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IN a recent address before the Society of Arts, which we quote elsewhere, Mr. Edward Atkinson cited in illustration the famous chapter on Snakes in Ireland, and pointed the moral that the proper relation between architects and underwriters is wanting. We have more than once insisted on the desirability of some relation, or, to speak more precisely, of some common action, between them. The relation which really exists, though commonly forgotten, is that of the men who suffer loss if buildings burn with those who are to design them so that they will or will not burn. The actual connection between these two classes of men, which might turn their relation to profit, does not exist. Instead of it we have the interposition of a third party, who has a connection with both, — the owner, who controls the building without suffering the loss if it burns, and who simply interrupts the reaction that would occur if the underwriter and the architect came together. The architect has a professional interest in making his buildings as substantial and enduring as he can; the underwriter has a pecuniary interest in making them incombustible; but the owner, who controls the architect, and on whom the underwriter's business depends, has many interests that conflict with these, and lead him to neglect them, or even to discard them altogether. The disadvantage follows which always occurs where the losses belong to one person and the precautions against them to another. That the actual loss to the community from fires is very largely increased by the practice of insurance companies there can be no doubt. So long as it is cheaper for an owner to pay his premium and transfer his loss to a company than to build a house that will not burn, he will be likely to secure himself in that way, though by doing so he endangers his neighbor and inflicts loss upon his community. The effect of the system is to give every man the right, in return for a small payment, to draw very largely on the general treasury in time of need, and, as might be expected, the general assessment is increased beyond reason. It has led to the development of a system of construction that entirely ignores the danger of fire, and is consequently more hazardous than is in use in any other civilized country; which, instead of improving in this regard as people grow richer and towns more compact, has grown more dangerous with the increase of speculative activity.

IT is difficult, then, to provide any effective connection between the underwriter and the architect, while the owner stands between, excepting through the owner. That the underwriter and the architect should consult together and work in concert for an end which they both, more than any other persons, feel to be necessary, and for which it is the special interest of the one and the professional care of the other to provide, is very desirable. But the owner holds the key to the situation. The insurance companies can influence him by combining to raise their premiums, or to reduce their risks. The keen competition between them, however, leads them to take unsafe risks, and undermines their controlling influence. Practically they seem to do little to check the mischief which their assumption of the losses encourages. The inattention of companies, at least until very lately, to any provisions for the safety of buildings against fire, their contented acceptance of whatever they find to be usual, are known to whoever has dealt with them, and have left them almost entirely without effect on the prevailing habits. A letter which we published a while ago from the architect of a theatre (see *American Architect*, September 13, 1879) was a conspicuous exhibit of their indifference in this matter. The experience described by Mr. Atkinson, which led to the formation of the Manufacturers' Mutual Companies, is still more striking testimony to it. The greatest obstacle in the way of improvement at present seems to be the divergence of interest between the individual owner and the insurers. The effective way to overcome this obstacle would be to bring the precaution and the loss home to the same persons, as in strictly mutual insurance, which might, perhaps, be more characteristically named a common insurance. Under the present system no class has so much power to influence precautions against fire as the insurers, and none apparently make so little use of it. If Mr. Atkinson's computation is right, that fifty per cent of premiums paid is covered by losses, and seventy per cent consumed in the expenses of some companies, it shows two things, — that the cost of administering the system is absurdly extravagant, and that the system itself leads straight to bankruptcy. When a large proportion of the companies have come to the failure that seems inevitable on this showing, the community may be brought to its senses, and led to attack seriously the underlying evil of bad building.

WE have received the report of the Supervising Architect of the Treasury Department for 1879. It contains the usual clear and concise statement of the condition of the architectural work in charge of Mr. Hill, including custom-houses, post-offices, and most of the other buildings now undertaken by the General Government, comprising an account of the progress of the buildings under construction, with the appropriations assigned to each, a list of outstanding contracts, the recommendations of the Supervising Architect for the coming year, and the customary schedule of all the buildings in charge of the Department, with their dates and total cost to this time. The sum total of the unexpended balances of appropriations in hand is nearly three millions ($2,835,989.10), including about twenty thousand in remnants of appropriations for buildings that have been finished within the year. The principal sums outstanding are (in round numbers), for the Chicago Custom-House, $594,600; for the St. Louis Custom-House, $318,800; for the Boston Post-Office, $240,400; for the New York Barge Office, $197,000; for the Cincinnati Custom-House, $135,000; for the Bureau of Engraving and Printing at Washington, $126,000; for the Memphis Custom-House, $113,500; for the Kansas City Post-Office, $109,500; for the Albany Post-Office, $98,000; for the Harrisburg Post-Office, $96,000; and for the Philadelphia Post-Office, $84,500. The buildings finished during the year are the Charleston Custom-House, the Evansville (Ind.) Custom-House, the Helena (Mont.) Assay Office, and the post-offices at Raleigh (N. C.), Covington (Ky.), and Lincoln (Neb.). The San Francisco Appraisers' Stores are to all intents completed. The work on the Barge Office in New York has been retarded by the danger of putting in the foundations before the sea-wall is finished, and will be begun in the spring. The walls of the Boston Post-Office extension have been carried up to the top of the second story, and the iron-work for the first and second stories is nearly ready. The St. Louis Custom-House has been delayed by the difficulty of providing the very large stones needed for the main cornice; but this is done, and the stone-work of the attic is almost finished. As usual, inadequate appropriations of Congress have caused more or less trouble. The stone-work of the Cincinnati Custom-House has been delayed by this cause, which gives occasion for the remarks of our correspondent in another column, and in this building and in two others, the post-offices at Philadelphia and Hartford, a suspension of work must soon follow.

THERE is encouragement for those who wish to see appropriations reduced in Mr. Hill's statement that the large granite contracts for several very important buildings with which his office has labored for some years are nearly carried out, and that the completion of the stone-work of a number of these buildings

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and the finishing of several others will reduce the estimates for the coming years very largely. We may hope, however, that Congress will not make this an occasion for still keeping the appropriations for current work at the lowest limit, but rather an opportunity for providing money fast enough, which can then be easily afforded, to carry on the work which remains on hand with the steadiness and vigor that a true economy demands, and avoid the waste of such interruptions as are mentioned in the report. This has been on the whole an advantageous year for the Government, says the report, and the low range of prices has given a chance for favorable contracts. The sudden revival of the iron trade, however, has been unfavorable to the work, having not only raised prices, but made some firms decline to offer bids for work at all, and others refuse to fix a time for delivery. Mr. Hill returns to the subject of a document building, urging that, although the housing of the Bureau of Engraving and Printing in a separate building will leave more room in the Treasury for storage of papers, the construction of the building does not allow of any distribution by which such storage can be made altogether safe. The report contains perspective drawings of three buildings which have not appeared before, the post-offices at Harrisburg, Kansas City, and Topeka (Kansas). They have the more than semi-classic character that prevails in the work of the present Supervising Architect, with a solidity and a dignity of design that well becomes public buildings, an air of reserve and simplicity in detail that will be an agreeable contrast to the exuberance and ostentation that we are apt to find in our private architecture, especially in that of our newer cities.

The remonstrances of the International Exhibition Company at Philadelphia against the revocation of their license and the removal of the Main Exhibition Building from Fairmount Park, their delays, and their efforts to put their undertaking on a sound footing do not seem to promise the crown of success. The Park Commissioners held a meeting on Saturday to consider the question of recalling their notice to quit, and the report then submitted by their Executive Committee is a pretty strong indictment of the management of the Exhibition thus far, and looks like a fair justification of the decision of the Commissioners. The terms of the license granted by the Commissioners at the request of the City Councils to allow the Exhibition Company to maintain permanently an "exposition of arts and manufactures and industries" are cited, and require that the buildings and grounds shall be kept in good order, and restored, upon due notice, in their first condition; that the building shall only be used for an exhibition for pleasure and instruction of the public, and not for the sale of goods; that none of the existing rules for the government of the Park shall be violated or set aside, nor shall any special permission before required be dispensed with under the license. Among the things which have been prohibited, except by special permission, are any musical, theatrical, or other entertainment, or any military or other parade or procession, or any gathering or meeting of any kind assembled through advertisement.

In the light of these conditions and prohibitions, the Executive Committee examine the history of the Exhibition, and bring forth from its records and advertisements an indictment which shows a curious disregard of the conditions and an odd contrast with the splendid promises and schemes for universal instruction on which we have before commented (*American Architect*, June 14, 1879). Under the management of the first president, Mr. Riddle, and the first board of directors, says the Committee, the terms of the license were adhered to, and the legitimate purposes of the Exhibition aimed at; but with their resignation came a change of policy, and thereafter began a series of transformations which are certainly astonishing in a Permanent Exposition of Arts and Manufactures. Varied by an occasional entertainment, which bore some resemblance, small or great, to the original purposes, — such as a grand industrial review, a display of fruits and vegetables, a display of millinery and harnesses, an exhibition of flowers, and a display of machinery, — we read of vocal and instrumental concerts, royal marionettes, Turkish and other conjurers, stereopticon shows, bell-ringers, jubilee singers, speeches, drills, billiard-matches, picnics, Sunday concerts, balloon ascensions, hops, fireworks, carnivals, a fancy-dress carnival on roller skates, and a Thanksgiving barbecue, leading up to a display of holiday goods, sold at reduced prices. All this seems to have culminated in a demand for five acres of ground, to be planted with corn for the animals assembled in an agricultural fair held without license, in which the Park was defiled with pig-pens, and the water of the Schuylkill contaminated in a way that brought the complaints of the Philadelphians upon the Park Commissioners; and, finally, in "a new circus-like performance called a tournament," held after notice to leave had been given the company for violation of their license. With this before us, we cannot be surprised that the Commissioners have resisted the pressure which has been brought to make them withdraw their notice to quit. One wonders a little at the indulgence which has brought forward even now a resolution allowing the company to try again, in case they can raise a fund of a hundred thousand dollars within six months, — a fund which it is probably assumed will deliver the company from the temptation to appeal to such extraordinary sources of revenue as have been mentioned, albeit a drop in the bucket of the supply which would be needed to carry out the ostensible purposes of the Exhibition.

Colonel Casey's report of the progress of work on the Washington Monument up to December 1, transmitted to Congress by Mr. Corcoran, Chairman of the Joint Commission, tells us that the amount of appropriated money still available for the work was at that date $100,740, of which thirty-two thousand is appropriated for the foundation and sixty-eight thousand for the completion of the superstructure. The whole of the concrete sub-foundation inserted under the masonry was finished on the first of November. We have already given a detailed account of this remarkable piece of engineering. Minute levelling showed that in the process the monument sank some two inches. The average settlement of the four corners was 1.9 inches nearly, the western side sinking about 1¾ inches and the eastern 2⅛ inches; the difference being fortunately against the leaning of the monument, which inclines a little toward the northeast. Besides this underpinning there is the buttressing of the monument, as it is called, by spreading out its lower courses in such a way as to distribute its weight over the wider foundation. A considerable part of the concrete which is to be used for this purpose is already laid. Colonel Casey computes that the money now in hand will be enough to complete the foundations, carry up the iron frame-work of the stairs 250 feet, and to add twelve feet to the shaft. To finish the whole as is now proposed to the height of five hundred feet, with stairs, elevator, and a pyramidion of glass and iron, will cost, he estimates, about six hundred and eighty thousand dollars more, and will take three years. It is a pity that so much engineering skill should be wasted on a monument in which, if it is to be carried out according to the present design, the people of the country will take no interest.

ARCHITECTS FOR GOVERNMENT BUILDINGS.

Apropos of the Supervising Architect, of whose report we have taken notice in our Summary, we have received a copy of an address delivered before the Association of Architects of Washington last month by Mr. John L. Smithmyer, in which discussing the defects of American architecture, he lays stress upon the difficulties and dangers of the Supervising Archtect's position and the disadvantages of the system which puts the care of the government architecture into his hands. The points he makes are briefly these: that our government architecture is on the whole not creditable; that the architectural chief is likely to be, and has too often been, a mere political appointee; that he has too much power, too much work to do, and too much money to spend; and that he is not responsible for his administration. The remedies which he suggests are the regulation of the Supervising Architect's office and the distribution of the government patronage among architects by competition, for both of which he would appeal to Congress, and the abolition of government contracts. The Boston *Daily Advertiser*, commenting upon Mr. Smithmyer's address, takes similar ground, discredits the public architecture as a whole, thinks the Supervising Architect has too much power and is too much dependent on politics, and suggests that the American Institute of Architects might render a great service "by devising ways and means for placing the erection of public buildings altogether upon professional grounds."

There are arguments for these positions and arguments against them. As for the responsibility of the Supervising Architect, he is directly responsible to the Secretary of the Treasury, as the Secretary of the Treasury is to Congress. Congress might prescribe rules for the administration of his office,

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but it is our impression that, so far as Congress has hitherto meddled with the administration of the Treasury Department, it has not made a success of it. The power of the Supervising Architect may be great, — at least he has the spending of a great deal of money, and his power in the spending of it is what the Secretary chooses to let him have. But if the appropriations are voted by Congress, the money is to be spent, and some one person must manage the spending of it. Even if a separate architect were appointed for every building the Government undertook, such architects must all be responsible to some one person, who must supervise their expenditures, and be substantially in that respect what the Supervising Architect now is, whatever his title might be. An attempt to make him more directly dependent on Congress would hardly mend the matter. He could not be directly responsible to Congress without being the head of a Department, a thing for which there is no provision in the present distribution of the Government. If, on the other hand, his appointment was subject to Congressional confirmation, like a collector's or a postmaster's, there would be more of politics instead of less in his vocation, and the mischiefs that are here complained of would be aggravated rather than relieved. It is very certain that the more immediately the office was dependent upon Congress the more immediately it would be exposed to political interference. As a fact, not one of the three men who have filled it since it became important has been a political appointee. Mr. Mullett, appointed by Mr. Chase, was unknown, and only became prominent as a politician in his office; Mr. Potter had nothing to do with politics, in office or out; and Mr. Hill's appointment was simply the advance of a capable subordinate. The fact that the office has, under the Secretary, the spending of Congressional appropriations makes it a mark for the influence of politicians, but its control of the spending of money cannot be subdivided, nor can it be transferred directly to the Secretary, who has neither the time nor the technical knowledge for it. In fact, the real grievances on which one can lay his finger are the facts that the Government does so much building and Congress appropriates so much money, and the tendency of politicians, especially of Congressmen, to interfere. The work must needs be all controlled by an expert, that is, by an architect or an engineer, and so long as there is so much of it, and so costly, it will bring its temptations to corruption or to political influence. The best safeguards we can think of are security of tenure in office, and seclusion as far as may be from political influence behind a cabinet officer, who is responsible for the Supervising Architect, and to whom he is responsible.

So far as we can see, then, the administration of the government building, the supervising of contracts and disbursements for them, must come more or less directly under the hand of one man, who must therefore have the power that goes with such a supervision. Probably nothing would be gained by increasing the number of intermediaries through whom his authority was exercised, nor by trying to make him directly responsible to Congress rather than to a cabinet officer. The contract question is too large for us to enter upon here. In favor of distributing the architectural work of the Government by competition there is more to be said. The amount of designing which has been required of the Supervising Architect of late years is more than one man can do justice to, and the incessant preoccupation with administrative work which his position enforces makes it almost impossible for him to put his best strength into his designs. The last two Supervising Architects, Messrs. Potter and Hill, have had the manliness to set this before the Secretary in their reports, and to propose to surrender to others of their profession what is the most attractive part of their work. There is reason to believe that if the government architecture could be divided among the best architects in the country it could be improved. But to distribute it by appointment would be to invite the maximum of political interference, and competition would seem to be the necessary alternative. The existing habits of competition among us do not incline one to look upon a great increase of it as an unmixed benefit, yet a habit of government competition might be of service in fixing a liberal and honorable standard. It may be questioned how much interest Congressmen are likely to feel in a proposal to create unlimited opportunities of patronage, and then to offer them up into the hands of the Secretary of the Treasury. In point of fact, four years ago, when a bill for establishing a Bureau of Architecture in the Treasury Department, and providing competitions for the designs of public buildings, carefully prepared by the American Institute of Architects, was introduced into Congress, and was followed by another less ambitious measure, prepared in the department itself, which simply directed the Secretary to establish such competitions, both bills were quietly shelved in committee, and were no more heard from.

It has never been quite clear to us why authority of Congress was necessary for such competitions. In the case of the New York Post-Office, a dozen years ago, such a competition was actually invited, and brought out designs from the most capable architects in New York. It was only set aside by the Department through the opposition of the then Supervising Architect, Mr. Mullett. There is not much reason to doubt that, judiciously carried out, it might have ended in better architecture, though perhaps not a better building, than we now see in the New York Post-Office. The experiment has never been tried again. We may, perhaps, assume that later Secretaries of the Treasury have not thought it well to establish the habit, without special authorization, of spending money outside in plans, for preparing which there is provision in their own department. If authorization of Congress is necessary, the simplest machinery is probably the best, as it is apt to be in simple matters, for instance the mere passage of a resolution, attached, it may be, to any measure to which it is germane, authorizing the Secretary to procure plans for public buildings, by competition or in any way he might think advisable; or a special provision, attached to the appropriation for any building, might authorize a like procedure. This, to be sure, would not compel competitions, or itself establish a rule, but it would give an occasion for trying experiments, which, if well administered and successful, might lead to a habit, and so be an obstacle to the ambition of a less scrupulous Supervising Architect, or make it easier to fix the rule by a definite law. At the same time, it would not cut off the Supervising Architect from all share in designing public work, or compel him to enter into competition for it, both of which we think would be very undesirable. Competitions so established would doubtless bring their own special difficulties, and might not lead to their expected benefit. We doubt if they would improve the public architecture in the average; but it is likely that they might in special cases, and these, perhaps, the most important. And they might, as we have hinted, if wisely and impartially administered, set an example of honorable management, of fair treatment and reasonable compensation to architects, that would help to redeem competitions from the disreputable condition into which they have fallen; otherwise, they would bring the whole system into deeper discredit, and in that case they might, at least, help to clear the way for something better.

THE OPEN FIRE-PLACE. XIX.

MATERIAL.

IT is evident that a porous material is unsuitable for the construction of furnaces, because the noxious gases generated by the burning fuel, especially by anthracite coal, pass through them under a back pressure, or even in cases of a sluggish draught. With an ordinary drum furnace like the Magee or MacGreggor there is almost always an outward pressure from within at the top of the drum even when the draught is good. Under a given pressure the amount of gas passed through a given material will be in direct proportion to its porosity. Cast-iron is said to be permeable to certain gases at high temperatures and, according to L. Cailletet,[1] to hydrogen gas even when cold. Whether the gases pass through the pores, or through invisible air-holes so minute that they may be classed as pores, is immaterial so far as concerns the furnace maker. It is sufficient to know that microscopic air-holes are so liable to be present in the castings that the material has been condemned as unsafe and unsuitable for gas-holders, compressed-air tubes, and all places where a gas pressure has to be resisted.

In order to test the degree of this permeability under varying pressures, the writer had cast six cylindrical boxes from some of the softer iron used by a foundry-man in making furnace and stove castings.

The boxes, having the section shown in Fig. 135, appeared to be perfect in every particular.

The top or mouth of each piece was threaded after casting so as to receive the end of a piece of gas-pipe two meters long threaded to correspond, making with cement an air-tight joint. (Gas piping was formerly frequently made of cast-iron, but its permeability to gas under pressure was too great, and it was abandoned in favor of wrought-iron.) Clean mercury was then poured into the gas-pipe and the pressure in atmospheres on the casting was known by the

[1] "L. Cailletet überzeugte sich dass das Eisen, nicht nur wie Deville und Troost nachgewiesen, im stark erhitzten Zustande, sondern auch bei gewöhnlichen Temperatur von Wasserstoffgas durchdrungen werde." (Wagner's Jahresbericht, vol. xiv., p. 54.)

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height of the mercury column (Fig. 136). It was found that under pressures varying from one to three atmospheres, the first three of the six castings tested allowed the mercury to pass through the pores or

Fig. 135.

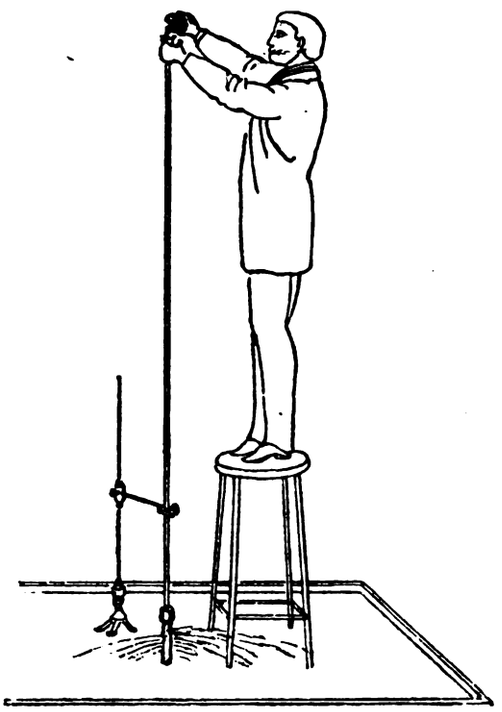

Fig. 136.

air-holes in minute jets, as shown in Fig. 136, projecting it, when the pressure was greatest, a distance of more than a meter from the vessel. Yet the feeblest pressure was sufficient to cause it to escape from the largest openings. The other three castings resisted the test. A greater pressure than three atmospheres could not be applied with the materials at command. The mercury became much dirtied, after the first three experiments, by impurities in the gas-pipe and castings, so that it is possible that the amalgam thereby formed filled the pores in the last three castings and itself prevented the passage of the pure mercury.

This experiment was suggested by the experience of Professor Wolcott Gibbs of Harvard University, from whom I have the following: He was filling a cast-iron pot with mercury, and had poured into it about fifty kilograms of the metal when it was observed suddenly to shoot out in fine streams in all directions through the pores of the vessel. Professor Gibbs described the iron which he used to be perfect so far as the eye could detect. The boxes in which mercury is put up for the market have to be made of wrought-iron.

The six castings tested as above described were fifteen centimeters long each, and nearly two centimeters in diameter. The metal was two millimeters thick at the threaded end under the shoulder, and about five millimeters thick at the other end. The object of this gradation of thickness was to discover what effect the thickness of the coating had upon its permeability. It happened that the mercury escaped in all cases at points near the middle of the cylinders, where the metal was of medium thickness. But inasmuch as it did not flow from all parts of the castings with equal freedom, but rather from particular localities in each, it would appear that it could hardly have passed through *pores*, as the term is commonly accepted, but rather through minute accidental pin-holes between the granules or crystals of the materials not to be avoided in casting. In this case iron of a hard, close texture would be open to these imperfections as well as soft iron, though not to so great a degree on account of the smaller size of the crystals. These openings may be partially closed by filing the surface of the casting. A file was passed over one of the castings tested while the mercury was escaping under the pressure. A number of the jets were obliterated, only the stronger ones remaining. For this reason samples to be tested should not be turned or filed, but subjected to the pressure in the rough state as they come from the foundry. It is also in this state that they appear in furnaces, for the sake of which the tests are made.

Hammering is still more effective than filing, and in wrought-iron the pores and air-holes are completely closed.

Thus every part, as large as the small samples tested, of every casting used in a furnace is liable to come out riddled, like them, with minute holes invisible to the eye, yet large enough to allow of the escape of gas under pressure. This outward pressure exists more or less frequently in every hot-air furnace now known. In the ordinary dome furnace it is constant in ordinary use, as previously said. Furnace men will differ in regard to this and will say that it is impossible, thinking that a powerful upward chimney-draught would overcome any slight upward tendency given by the height of the dome above the lower opening into the smoke-flue.

Others will be as positive the other way. But the practical furnace man is unfortunately not the authority to consult on these matters. He is commonly ignorant of the scientific principles which should govern the construction or regulate the use of a furnace, and generally unwilling to see the virtue of any arrangement not found in his own.

To ascertain the truth, the writer was obliged to have a hole bored in the top of the dome of his own furnace, which is a wrought-iron MacGreggor furnace No. 4, one which is to be recommended. It is similar to the Magee shown in Fig. 132. The opening was five centimeters in diameter and threaded to take a brass tube as shown in Fig. 137.

A manometer was attached to the tube and the pressure of the gas from within or without accurately measured in millimeters of a water column. It was found that there was *a constant outward pressure* of from one to eight millimeters, according as the check-draught door was from one to five centimeters open. Or, roughly speaking, a pressure of about one millimeter for every centimeter of opening. No valve was used in the smoke-flue. The same pressure outwards occurred when the feed-door was open.

There was never an inward pressure except when the draught up the smoke-flue was too powerful to be left with safety.

From these experiments, therefore, the necessary inference is that cast-iron furnaces afford no adequate security against the escape of gas. Even if tested under pressure before use, a precaution which no furnace dealer or maker would venture to take, even if it were practicable,[1] they would still be unsafe for the following reason: a casting of iron when examined in section, Fig. 138, will be found to be densest at the surface and more and more open or larger in grain approaching the centre. In a section of soft Scotch pig-iron the granules at the centre appear as large as those in the centre of our figure, while the outer portions are very much finer. Outside of all a coating of silicate forms a thin skin comparatively impervious, so that a furnace, which when new would resist every test, might prove to be quite useless as soon as the thin outer coatings were destroyed by heat and rust.

With wrought-iron these objections do not hold. The gas-pipe used in the experiment illustrated in Fig. 136 was of wrought-iron. As was to be expected, no mercury passed through it under the greatest pressure then applied.

Wrought-iron is, however, more quickly burnt out than cast-iron.

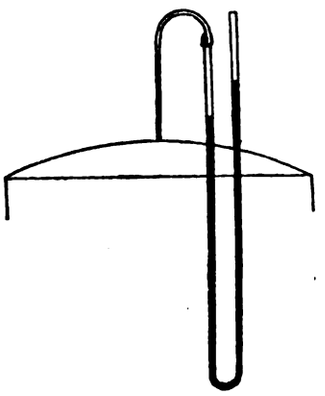

Fig. 137.

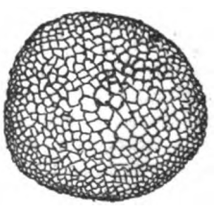

Fig. 138.

But the difference is not important, especially where fire-clay linings are used and proper care is taken in its management.

What will happen to iron in a *red-hot* condition seems to me to be entirely of minor importance. The matter is almost wholly dependent upon the *quality of the castings used*.

To obtain castings which, in the *cold* state, will allow no gas to pass through under greater or less pressure, either when new or after a little use, I believe to be difficult if not impossible, as furnaces are now made, and at best always a matter of chance.

Most basement furnaces are now so constructed that it is never necessary to raise them to a red heat to obtain the best results, and, in practice, this high temperature is seldom seen except under careless management.

The experiments of Deville and Troost (who were bound, as scientific and conscientious investigators, to select with care perfect castings for their test) show that a very small quantity, about *one half a cubic centimeter*, of carbonic oxide was found at the surface of the iron when heated to redness for *every million cubic centimeters* of air passed over the stove. Of this small quantity, part was generated by the fuel within and permeated the iron, and part was formed on the surface by the decomposition of the constituents of the air coming in contact with it. These experiments, and the report of General Morin to the French Academy, have given rise, for the last ten years, to endless heated discussions as to the danger of iron in this condition, — discussions as fiery when prompted by pecuniary interests as the iron itself under consideration, and having as little to do with the practical question as red-hot iron has to do with properly made

[1] The only test made by furnace men is a "careful" ocular inspection. This is evidently equivalent to no test at all, the air-holes being microscopic; a test would involve either setting up the furnace complete and applying atmospheric pressure or else a special test of each particular casting, both of which are too difficult to be applied in practice.

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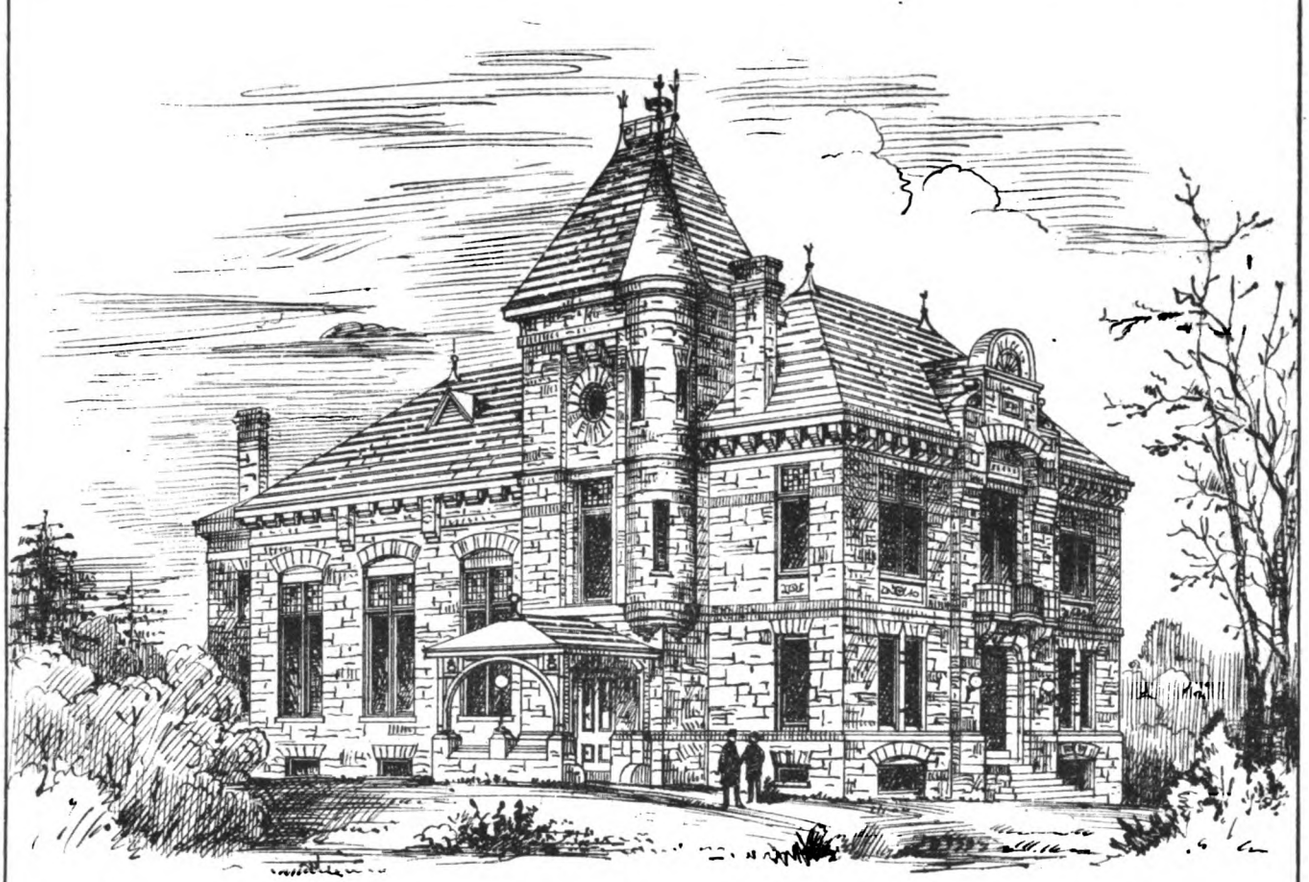
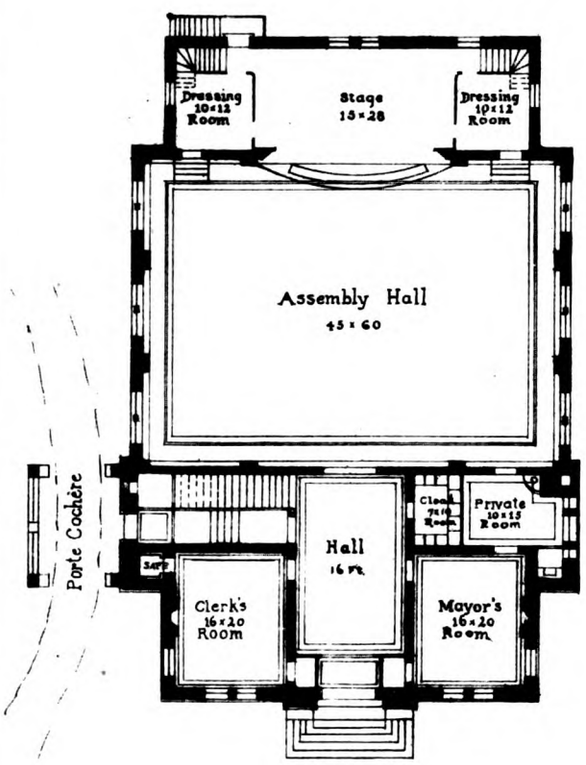
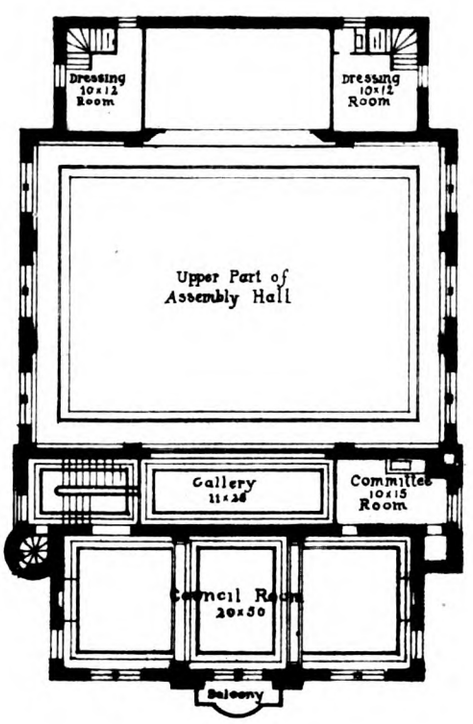


Avondale Town Hall

Jas. W. McLaughlin
Archt. CINCINNATI O.



First Floor Plan



Second Floor Plan

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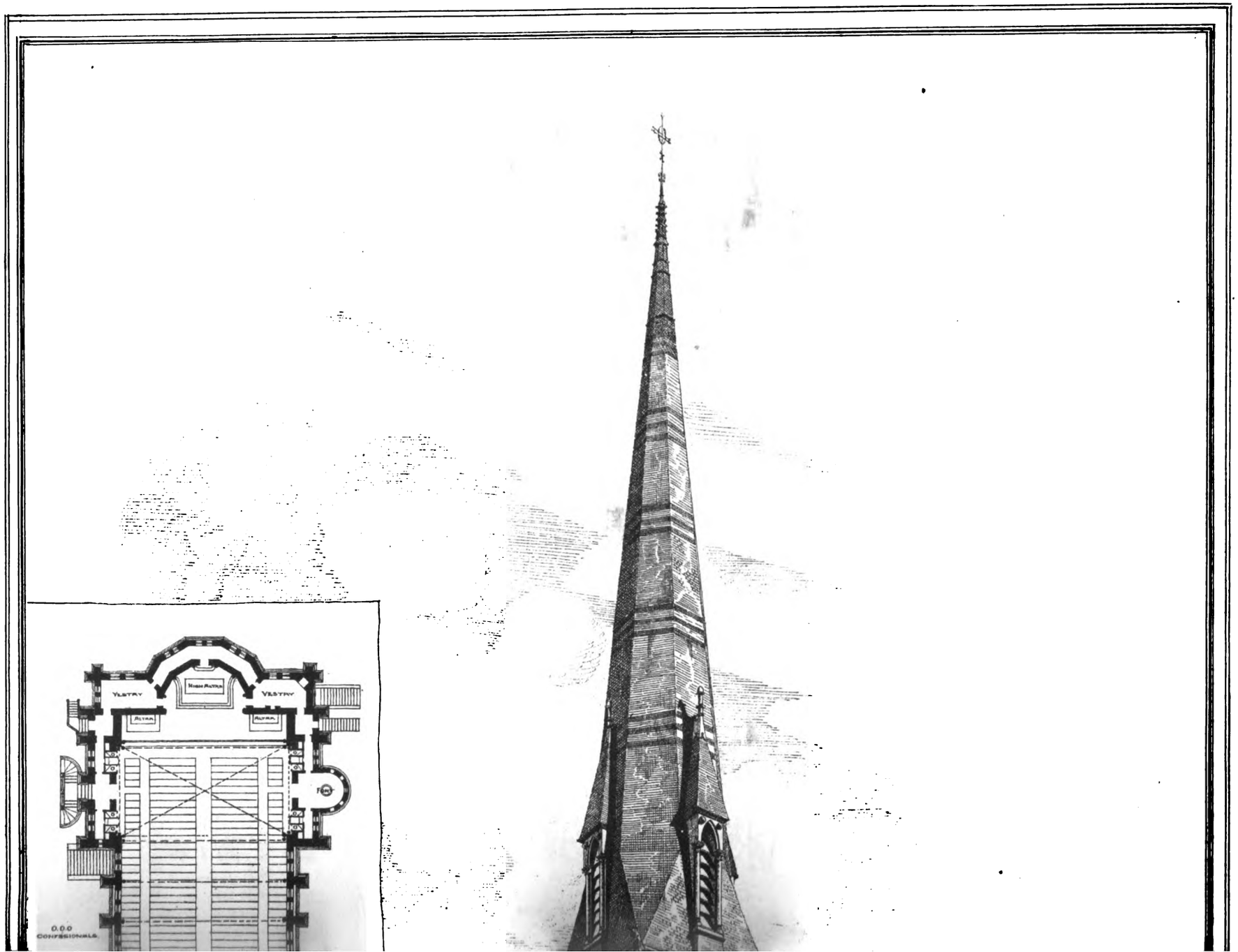

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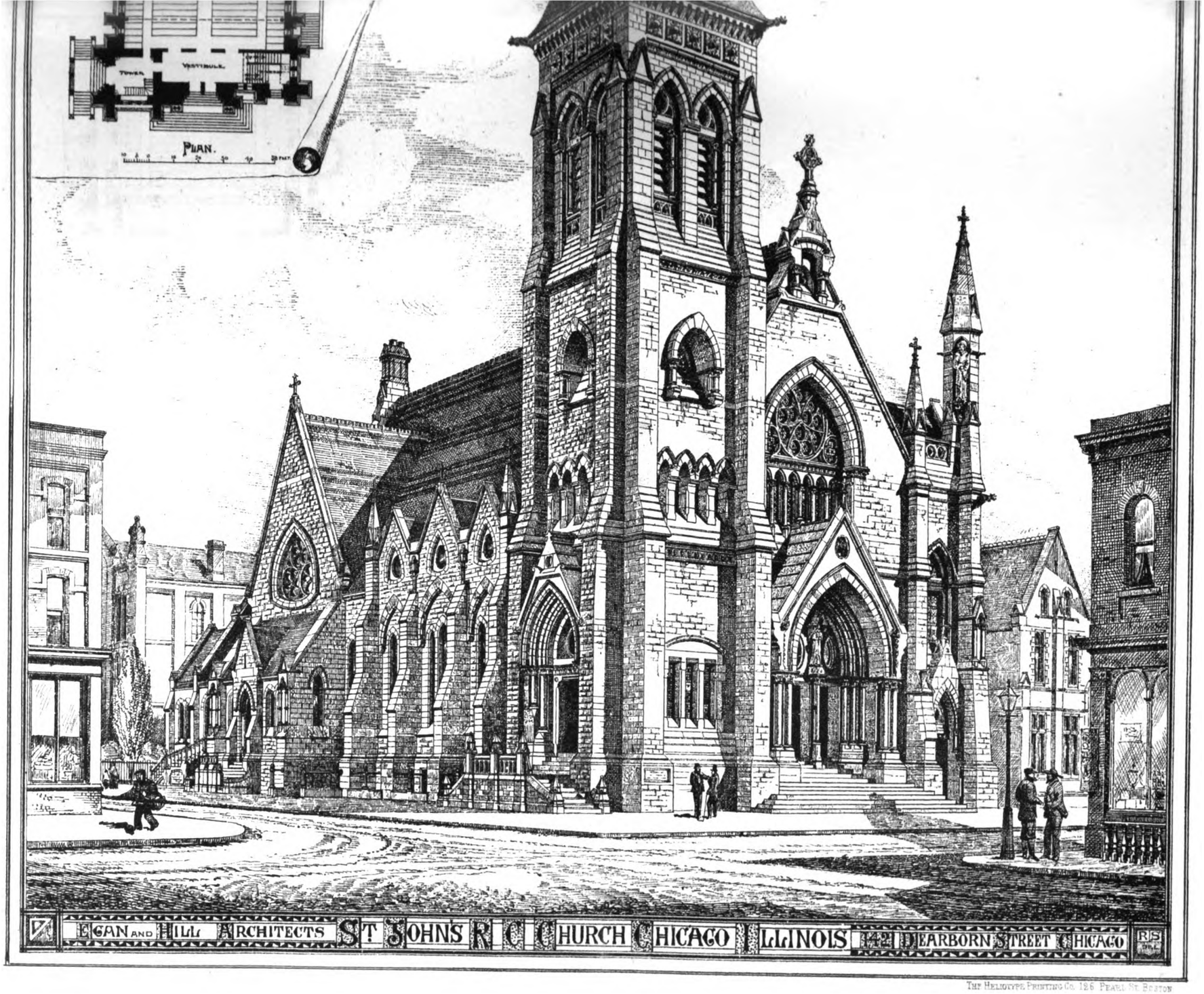

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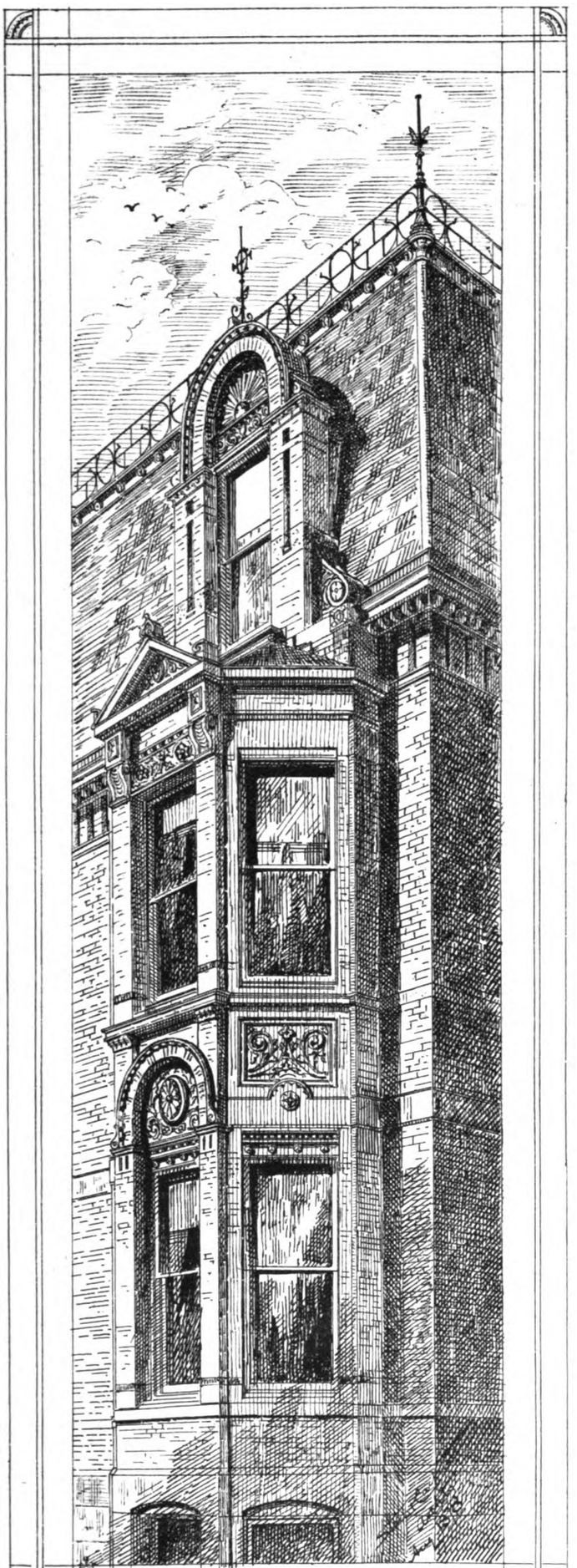

STUDY FOR BAY WINDOW.

STONE & CARPENTER, ARCHTS, PROV. R. I.

THE HELIOTYPE PRINTING CO. 239 DEARBORN ST. BOSTON

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modern hot-air furnaces in general. Since these famous experiments the iron has cooled off to a moderate temperature, but the discussions glow as fiercely as ever.

The fire-pot, now much thicker than the iron of the stove tested by Deville and Troost, is, in a proper furnace, also protected by fire-clay (practically to prevent the iron from burning out, but nominally to allay the fears of the worried and excited public). The radiating surfaces remain as thin as before, but are no longer heated to redness.

THE ILLUSTRATIONS.

ST. JOHN'S (ROMAN CATHOLIC) CHURCH, CHICAGO, ILL. EGAN & HILL, ARCHITECTS, CHICAGO.

THE accompanying illustration is a true perspective view of the new St. John's Roman Catholic Church, on the northeast corner of Clark and Eighteenth Streets, Chicago, now building. The building is now roofed in and the tower is finished up to the belfry stage level. The interior work will be commenced in the early part of the spring. The dimensions of the church are 83 feet in front, 161 feet in depth, and the height from level of sidewalk to cross on front gable 100 feet, while the finished spire will have an altitude of 225 feet. The material of which the building is constructed is Lemont limestone, it being used as rock-faced ashlar in the body of the façades, while the finish and general architectural details are bush-hammered and tooled. The columns of the doorways, etc., are of polished gray granite. The interior finish of the roof is of a somewhat peculiar construction, it being an open-timbered, hammer-beam, and bracketed roof of 64 feet clear span. The estimated cost of the building is $120,000.

DESIGN FOR A BAY-WINDOW. MESSRS. STONE & CARPENTER, ARCHITECTS, PROVIDENCE, R. I.

TOWN-HALL, AVONDALE, O. JAMES W. McLAUGHLIN, ARCHITECT, CINCINNATI, O.

This building is being erected in the village of Avondale, one of the suburbs of Cincinnati, for the use of the corporation and for general assembly purposes. The material of the exterior walls is the local blue limestone, laid in random courses, with finish of Buena Vista freestone. The roof is covered with dark Virginia slates. The cost will be $16,000, F. W. Handy having the contract for the whole work.[1]

CORRESPONDENCE.

QUEEN ANNE WORK. — NEW BUILDINGS.

CINCINNATI, O.

DURING the past year there have not been any buildings of magnitude either started or finished, but there have been a considerable number of moderate-sized buildings built. Everything seems to be running to pressed-brick fronts: go where you will the red pressed-bricks loom up before you in a manner somewhat startling to those who have been used to the sober freestone of which this city is mainly built. Pressed-bricks being used so freely, it naturally leads the architects into the inevitable Queen Anne. It perhaps will remain an open question as to whether this pressed-brick and Queen Anne craze is the consummation so devoutly wished for, or whether it is not more like unto a woman's bonnet, in style to-day, and to-morrow, — why, no one will look at it. This much is certain, however, that so far in this city there has not yet been built a pressed-brick front which does not show numerous cracks, which are, to be sure, merely "local," and mean no serious harm to the building, but their existence calls for some manner of prevention at the hands of the architects.

The building now under roof at the corner of George and Race Streets, designed by Mr. Hannaford, is perhaps the best example of this style that has yet been built in this city. It has every peculiarity of the Queen Anne, and is a very creditable effort. The building is to be occupied by the Phœnix Insurance Co. The Wiggins Building, corner of Fifth and Vine Streets, is a plain, six-story stone-front office-building, designed by Mr. McLaughlin, and presents nothing new, which is somewhat disappointing since it occupies the most prominent corner in the city

The "Albany" is another office-building, nearly completed, at the corner of Vine and Baker Streets, — pressed-brick and freestone, and Queen Anne. This building started out to be the most Queen Anneish of any, but it ends up in execution a rather tame affair. Mr. Hannaford was the architect.

The Government Building, — well, this pile of granite and iron is making haste toward completion with its usual slowness. The fourth story, with its round-headed windows, seems to be completed, and now will come the main cornice, the balustrade, and the immense roof. This building grows so slowly that it hardly seems to grow at all, and it will take, no doubt, this year and next to get the roof on.

All things considered the architects have reason for self-congratulation that during the year just ended business has been reasonably brisk, with prospects of a still more busy season to come. C.

[1] This is the building in regard to which the Builders' Exchange protested against the awarding of the contract, for the reason that the State law forbids the making of contracts for an entire building, of which the cost will exceed $10,000, to one person.

THE ARCHITECTURE OF ROME.

[We translate the following extracts from a new book by M. Henri Houssaye.]

THE monuments of ancient Rome impress one with the idea of grandeur, but not with that of beauty. The Cæsars, monsters as they were, were incapable of inspiring the serene creations of the Greeks. They could only create monsters — monsters of grandeur, indeed, of magnificence, of richness. The divine harmony, the sovereign reserve, the pure rhythm of the Greeks, were unknown to the Romans. There is even something monstrous and *tourmenté* in the Colosseum and the Forum, as in the Baths of Caracalla.

Like the monuments of pagan Rome, so the edifices of Christian Rome impress us with the idea of grandeur and magnificence, but not with the idea of beauty. The precious marbles, the overloaded ornament, the blaze of gold everywhere, the brilliant coloring of mosaics, savor more of the theatre than of the temple. But even through its excess this splendor acquires a grandiose character. With something less of luxury and costliness the interior of St. Peter's would have the air of a ball-room or a theatre. Such as it is, it seems a colossal tabernacle, which strikes one with a sudden awe.

Beauty, then, seems wanting in Rome. But, on the other hand, everything about the city is grand. Even the rococo style of the Jesuits, which prevails in most of the churches, is grandiose and imposing.

All the Roman ruins have a certain barbaric aspect which is never observed in Greece. Their sculpture is often almost effaced by time, the stone and marble of the monuments is rather hewn than dressed, and the courses of the masonry are laid in an almost cyclopean fashion.

But, independently of these imperfections, the Roman ruins can never produce the impression which one feels at Athens, because it is impossible to be alone with them. Over every pediment, every portico, every colonnade there rises some dome, or belfry, or campanile, some sordid hovel or vulgar convent hides the façade of a temple, some wretched priest or begging monk appears under a triumphal arch. In contemplating these monuments of the past we are perpetually reminded of the present. And what a present! On the Acropolis one may imagine himself living in the age of Pericles. It is very hard in the Forum to imagine one's self living in the age of Augustus. . . . .

When France sets herself to any enterprise her hand is soon recognized. Ten years ago nearly the whole of the ruins of the Palace of the Cæsars, on Mount Palatine, were buried under ground, and covered with a wild vegetation, amid which the owls found an undisturbed retreat. To-day the excavations begun by the Emperor Napoleon III. — *cuique suum* — have brought to light a new Pompeii. Foundations appear, many still carrying their ground-floor apartments; statues, busts, pedestals, fragments of sculpture, shafts of black marble columns issue from the ground; frescoes, bright and warm in color, and superior in execution to the paintings in the museum at Naples, glow in the sunlight. Guide-posts, inscribed with texts from the Latin authors, indicate the sites of the streets, the palaces, the gardens of the imperial mount. With his Tacitus and Suetonius in hand one may wander through the innumerable labyrinths of this theatre of the splendors and crimes of the Cæsars. All this work is carried on with a method and a cleanliness which are very foreign to Rome. . . . .

The ruins of the Baths of Caracalla seem to have been born of storm and tempest. Everything here is on such a scale that one almost refuses to believe it the work of mere mortals, and would rather believe these immense blocks of travertine to have been dropped here by some cataclysm, or thrown from the slings of Titans fighting against the gods. And if one imagines these colossal buildings entirely clothed with the rarest marbles, serpentine, lapis lazuli, rouge and verd antique, supported on columns of porphyry, rose-granite, and basalt, decorated with frescoes and mosaics, filled with more than two thousand statues of marble and bronze, — of which the Torso of the Belvidere, the Callipygian Venus, the Flora, the Venus of the Musée Chiaramonti, the Farnese Hercules and Bull, are only a few of the masterpieces, — an immense library, hot and cold baths, theatres, circuses, arenas, where three thousand hired bathers found employment, and an army of gymnasts, actors, and athletes; and finally that every Roman citizen might enter here freely, without price, the whole being offered to the people and paid for by the Emperor, — such a picture staggers the reason and overwhelms the imagination. . . . .

For one curious in the history of art there are few more interesting subjects of study than the paintings of the sixth century in the crypts of the Church of San Clementi. One can here put his finger on the transition-point from pagan to Christian art. These figures are not yet stiffened by the immovable drapery imposed by the Byzantines; art has not yet bound itself in the monkish strait-jacket which it is only to burst ten centuries later. In the frescoes of San Clementi one sees the traces of the fine movement and the easy charm of the Greco-Roman paintings. The expression of the heads is Christian, but the bodies are pagan. . . . .

The crypts of the Capucins are divided into several halls, entirely decorated with tibias and femurs, with skulls, vertebræ, clavicles, and every sort of bone. The earth of these chambers has the prop-

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erty of preserving bodies from decay. The Capucins are buried here, and after lying three years in the ground are exhumed. If the bodies are in good condition they are clothed with the robe of the order, put into an attitude of prayer, and stuck up thus, upright and with clasped hands, in niches formed of the bones of their brethren. If the bodies are, on the other hand, partly decayed, they are dissected, and their bones are used in the construction of vaults and walls and niches, of lamps, crosses, and funeral emblems with which to adorn the walls.

It is the rococo boudoir of the king of terrors. Nothing can be more indecent than this immodesty of death, this violation of the grave, this exhibition from beyond the tomb. Surely the Capucins well deserved the sarcasm of Voltaire, who said to one who had signed himself *an unworthy Capucin*, "Of what can you be worthy, if you are unworthy of being a Capucin?" . . . .

Certain churches of the Middle Ages are symbolic. The dismal crypts represent the Church suffering, the Church in purgatory, the Church persecuted and hiding herself, the Church of the catacombs, the desert, and the martyrs. The nave, where the light passes through the narrow pointed arches, stands for the Church militant, the Church of Earth, where the faithful are struggling against temptation and anguish, the Church of Constantine, of Charlemagne, of the Crusades. The towers, lifted into the light of heaven, symbolize the Church triumphant, the Celestial Church of the Blessed, the Church of the prophets.

One may trace a like symbolism in the various styles of religious architecture which have followed each other across the ages.

The Romanesque churches, with their full-centred vaults, their elliptic arches, their low doors, like the posterns of a fortress, crouching under heavy lintels, their massive and coarse sculptures, their barbaric simplicity, — here, again, is the Church in tribulation. The Gothic cathedrals, with their airy vaults, their stone lace-work, their sharp spires and pinnacles, which seem as if destined to arm the heavenly legions, their parapets like loopholes, their sharp ridges, their long reaches of sinister shadow, their expression of courage and *élan*, represent the Church militant. The Roman basilicas of the sixteenth century, of which St. Peter's is the prototype, with their immense domes filled with golden light, their vast windows letting in the sun in all his splendor, their vaults blazing with decoration, their casings of precious marbles, their columns of porphyry, jasper, agate, lapis lazuli, and rouge-antique, their altars of silver and gold, incrusted with sapphires, rubies, and topazes, their pavements of marble and mosaic, — these stand for the Church triumphant.

ARCHITECTS AND UNDERWRITERS.

[We copy from the Boston *Journal* some parts of its report of an address delivered last week by Mr. Edward Atkinson, in Boston, before the Society of Arts, on "The Relation of the Architect to the Underwriter."]

"I have given to the secretary as the subject of the evening, 'The Relation of the Architect to the Underwriter.' I might close that chapter like that on the snakes in Ireland — there are no snakes in Ireland; there is apparently very little relation between the architect and the underwriter. It is rather the relation which ought to exist between them to which I shall devote my attention. It will be found among the undoubted facts that the fire-tax imposed upon the people of the United States is the heaviest tax to which they are now subjected. It is distributed with greater equality than almost any other. It is more than equal to the cost of the largest standing army of any European nation. It is as causeless and as useless and as unfit as would be the existence of a standing army of an equal cost in the United States. The record of the fires of four years prior to this which has just ended, carefully calculated after the facts have been ascertained, and not from mere newspaper report, amounts to $327,000,000. The last year exceeds the average. The indirect charges are the cost of sustaining insurance companies, not less than $30,000,000, and the cost of fire departments, not less than $25,000,000. The price we pay for carelessness, ignorance, stupidity, and, I think, less than we commonly think, fraud, is $130,000,000 a year. The actual sum paid out by insurance companies in the four years preceding this year was $170,000,000.

"Now, by what title have I any right to speak on this subject, representing an insurance company, representing a method of insurance which is assumed, as a rule, by most persons to be of an entirely different character from the ordinary method of insurance, a mutual insurance company, with no capital whatever, insuring textile factories, paper-mills, and machine-shops — the extra hazardous risks as a whole? Forty-five years ago the Hon. Zachariah Allen, of Rhode Island, having a cotton factory with some of the appliances that are now known to be effective, went to an underwriter of that day and asked that, in consideration of those appliances, the rate of insurance upon his factory should be reduced. The answer which he received was, 'Oh, we can't send our men around to look at these little improvements that may amount to something and may not. The rate on cotton factories is two per cent. You may take it or leave it.' This induced Mr. Allen to found the system of the mutual insurance of factories, with a system of inspectors who did go around to look into these little appliances and see whether they made any difference in the risk or not. The result of that is a combination of companies now insuring $200,000,000 a year, each insuring the other. The company of which I am president insured last year $43,000,000. It was a disastrous year in other lines, a year of excessive losses; we have lost less than $14,000. The mutual alliance of companies which Mr. Allen founded forty years ago returned to their members this year, on the first of January, on the risks then expiring, an average of ninety per cent of their premiums, and their average premium on the mills which they insured instead of being two per cent is nine tenths of one per cent. The sending around of a few young men to see whether these appliances were good for anything or not has reduced the cost of the insurance of those extra hazardous properties to nine one hundredths of one per cent the past year.

"Now let us look at the architect. I know and count among my personal friends many men as thoroughly competent to build safe warehouses, safe churches, and safe school-houses, as any architects in the land, and what I shall say will not apply to them. I shall speak only of those who, having had a few lessons in the art of design, and being capable of copying from photographs, and of combining a few elements of outside architectural effect, in many cases entirely unfitted to the climate and conditions of this land, but incapable of considering this or the necessities of the business to which the buildings are to be devoted, assume to be architects, and impose upon public opinion. Pretty pictures put into brick, stone, and iron are many of the buildings in the new part of Boston, unfit to be insured, incapable of being lighted, as to many rooms, unprofitable to the owners, and, as soon as their interior faults are known to those who examine them, no longer carrying any pleasure, even to the eye, in their outside decoration, however beautiful it may have appeared until its utter unfitness had been measured. The men who build those structures I don't call architects. I have given the values of fires for four years; now let us go to classes. In the years 1875, 1876, 1877, 1878, — 1879 increasing the average, but not yet compiled, — there were burned, wholly or in part, in the United States, 1,354 hotels, 265 churches, 182 school-houses, 40 court-houses, and 45 almshouses, hospitals, asylums, and poorhouses, — a total of 1,883. That represents a class of structures that some skill, some architectural requirements, some capacity is usually supposed to be applied to. Let us go to another class to which the art and skill of trained men is not supposed to be applied: saw-mills, 652; livery stables, 523; furniture factories, 372; liquor stores, 733, — in all, 2,280 uninstructed, or about 400 more than the instructed. Now, gentlemen, I said that my predecessors, my coadjutors, have made cotton factories, woolen factories, and paper-mills better risks than stone churches, brick school-houses, and iron warehouses; and, perhaps, better than hospitals.

"Now, why?" Mr. Atkinson gave a description of the structure of the Immanuel Congregational Church, burned about a year ago, saying that it was in reality a wooden building inside a stone shell, and drawing the conclusion that the fire was caused by a defective arrangement of heating apparatus. He referred to the danger to property arising from rats building their nests of oily rags, stating that a fire arising from that cause had damaged the Rialto Building some $2,000 or $3,000. He spoke of the new Latin School-House as a building in which the danger of fire has been very thoroughly considered, but still one in which there is great danger of fire, from the facts that its dados are of wood and separated from the walls, and that public opinion has compelled the erection of a roof that is by no means what it should be. He next referred to the Sturgis building, in which an incipient fire was checked by a plastered flooring, and asked how many structures there are in Boston that are protected in a similar manner. Since he had been an underwriter he said that he had seldom found such protection; on the contrary, he had examined many buildings in which the motive of the architect seemed to have been to protect fire from water, and that was the rule throughout the city, in the new part and in the old. Now, he said, we come to iron warehouses. "We had a fire the other night, and it brought down iron warehouses with iron roofs; there was a loss then of about $550,000. I had visited the building in which the fire took many times, and years ago, before the passage-way was cut through from it into the Cathedral Building, it made me shudder when I went to the upper stories of that building and saw the number of men and women at work in them; for it had wooden stairways for their exit, lined upon each side with wooden boards. I would have insured that building, with its kind of occupants, at a lower rate to burn within twenty-five years than I would have insured it not to burn." Mr. Atkinson criticised the employment of iron shutters to keep out fire, saying they warped as soon as the flames struck them, and that wooden ones covered with tin are much more serviceable.

Mr. Atkinson then answered his question as follows: "There are some lights that can be drawn from factories, and there are some things that cannot be. The modern factory has no place in it, if we know it, where a rat can build a nest and not be found, or where fire cannot be reached by water. The factory properly consists of a brick wall, with the floor timbers eight feet apart. These are about 6 by 12 inches, and on them is laid three-inch plank, and sometimes two thicknesses of tarred felt, and then the top floor. The whole construction is open; the spaces between the beams are wide, not narrow; water can be sent in great streams crosswise or lengthwise. The roof is built in the same way, nearly flat, so that

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whatever happens there is a standing-place upon it for the firemen. There is not a great mass of gables and cornices and concealed spots, which modern architecture so many times requires, and which public opinion imposes upon architects who know better. In the factory we don't allow any furrings or plaster on the walls. There is another thing which we never permit in the factory, but which, like iron shutters, is, I believe, required by the building law of this city, — that the timbers should be connected with the walls, so that when the beam burns off or is torn off it brings the wall down. We have the beams laid on an iron plate, with their top corners arched off, and the bricks immediately above them laid dry, so that if anything happens to those beams they roll out of their places and do not tear the wall down. But the great secret is cleanliness and order and the means of putting out small fires. When the secret is discovered how to make the interest of the assured and the interest of the underwriter identical, and to give the assured an interest in the success of the insurance company, as it is in the mutual company, then discipline may be enforced."

OSCILLATION AND VIBRATION OF MILL BUILDINGS.

BEFORE citing any examples of the jarring of mills, I desire to call attention to the character of such motions, and the difference between oscillation and vibration, and then, with this distinction and its causes understood, we will consider a few cases of the vibration of factories and the nature of the remedy.

The motion of a pulsating body is either oscillation or vibration; the first being caused by external forces; and the second the consequence of forces, one of which is the cohesive force within the body, binding its molecules together, and dependent for its character upon the elasticity of the body. To illustrate: If a suspended wire is struck, the forces of the blow and of gravitation cause it to oscillate; if the same wire is strained between two points, the forces of the blow and of elasticity cause it to vibrate.

The rapidity of this vibration is governed by the dimensions, elasticity, and tension of the body; and every mass will vibrate at a constant velocity, whenever that vibration is produced by adequate causes and conditions. Not only every piano-forte wire and organ pipe, but every bridge and factory has it key-note. As the vibrations of the communicating air will force the piano or organ to answer in harmonious response to the tone of the voice, so the structure will reply to the proper vibratory force.

The shaking of a mill is chiefly limited to the vibration of the elastic floor and beams; while the swaying of the whole building is generally caused by oscillation. Both of these motions appear in the same building, but oscillation is due to poor construction, while vibration is produced by impulses synchronous with the key-note of the building, and bears no relation to the solidity of construction. In a certain district of New England many factories were built during the war when high prices, haste for completion, and perhaps limited capital, resulted in poorly constructed buildings. Shabbiness prevails everywhere, the walls are too light, the beams too small, and the floor planks too thin, when compared with structures built by our leading engineers as standards.

In many instances, the weight of the machinery has deflected the floors several inches, and in others, additional columns have been necessary to keep the floors level. The oscillation of these mills is excessive, but I do not recall an instance of extreme vibration.

In the practical construction of machinery, the revolving portions are not *absolutely* balanced; and when one considers the immense weight of revolving parts of mill machinery and its velocity, it seems as if the aggregation of unbalanced centrifugal forces would overturn, instead of merely jar, a mill; and such a destructive result would undoubtedly ensue if these irregularities acted in unison, instead of opposing each other.

Let us consider the characteristics of a vibrating mill floor by comparison with those of a metal plate when vibrating under conditions which are simple and easily controlled.

If a metal plate is supported at the centre, and a violin bow be drawn across the edge, the plate will not vibrate as a whole, but in divisions, which are readily distinguished if sand has been dusted on the plate, as the vibrating portions will jar the sand to the nodes or dividing lines which are at rest. If the plate is a square one, and the bow drawn at the corner, while the free vibration is damped by resting the finger at one side, midway between the two corners, the sand will gather in two lines, dividing the plate into four equal squares; if the bow is drawn at the middle of one side and the finger placed at one of the corners, the ridges of sand will divide the plate along the two diagonals extending from corner to corner; and by varying the positions of the damping points and the bow, the nodal divisions resolve into complex and curious curves and lines. A vibrating mill-floor is under similar conditions, except that the contact of pillars and surrounding walls, as far as they restrain free vibration, complicates the details of these vibrating divisions beyond the power of analysis, except to show that the vibration of the floor is separated into numerous and irregular divisions.

The effect of these forces has been observed in many factories, and for examples I would refer you to the ring-spinning rooms, where the frames are of the same manufacture, and supposed to be operating under identical conditions; some of them will shake violently, while others beside them run as steadily as could be desired.

Some of the gas-pipes extending from the ceiling in the upper story of a flat-roofed mill were observed to be in motion, while others were stationary, showing some of the divisions in the vibrations of the roof. On account of their rigidity gas-pipes do not indicate the divisions of vibration as sensitively as hanging lamps. In a mill at Haydenville, Mass., the vertical motion of certain hanging lamps showed that there was a vibration of the floor amounting to an inch in some places. Other lamps moved less and some were still.

One of the most delicate indications was in the unoccupied attic of a mill at Exeter, N. H., where the agent had judiciously placed upon the floor numerous fire pails filled with water. The surfaces moved in unison with the vibration of the floor, generally swaying, some traversed by successive lines of waves, whose direction varied in different pails, others evidently over nodal lines were at rest, while a few which were situated upon centres of vibration were covered with ripples such as are produced when a hanging pail of water is struck underneath. Of two pails situated within a foot of each other, one indicated by its ripples that its position was over a centre of greatest vibration, while the other showed by its wave-like motion that its location was near such a point of greatest vibration, but not over it. The vibrations of the floor are in waves moving up and down without any progression, and the character of the motions of the water in these pails was concurrent with such action.

It is well known that some notes on a church organ will cause only certain portions of that church to vibrate. I have been informed that in some portions of the picker building of a Woonsocket mill, the vibration jarred the dust to the nodal lines, showing the divisions clearly.

Although these areas of vibration are modified by the columns and walls, yet they are not coincident with any divisions of the floor, because excessive vibration has been observed near such places, while the portions away from such support were at rest, but the reverse is generally the case, and most perfect repose is near the points of greatest stability, where one would naturally expect to find it.

The superintendent of a New Hampshire mill, when in the factory on Sunday, was greatly surprised at the shaking of the building. He observed that the water was flowing in broken sheets over the dam, and presumed that the pulsations of air were synchronous with the key-note of the mill; continuing his observations, he learned that with a greater or a smaller flow of water over the dam, the mill was at rest; and also with the scuttle in the roof open, so that the puffs of outside air were in free communication with the interior of the mill, the vibration was much greater than when the scuttle was closed.

At Centerdale, R. I., the water flowing over the dam caused at times a great vibration in the mill. This has been stopped by fastening vertical pieces of plank, at intervals of ten feet, against the front of the dam, and projecting upwards so as to break the long sheet of water into numerous short falls, whose key-note was different from that of the whole sheet of water which they displaced.

At the Essex Woolen Co., mill number 8 is sometimes thrown into vibration by the water flowing over the dam, and when this happens, the watchman on duty alters the note of the dam by opening the waste gate, and the mill soon comes to rest. Mill number 5, of the same company, but at a privilege lower down the stream, is often thrown into vibration by the falling water at that point, and the story is told that a watchman once fled from that mill, thinking that it was about to fall.

Of the eleven mills owned by this corporation, I have been told that none of the others vibrate from the above cause. When in operation, mill number 6 was often thrown into vibration by the motion of the machinery.

When vibrations are due to machinery, they are stopped by changing the speed.

At the Merrimac Mills, Lowell, and many other places, this method has been successful. It is unnecessary to cite further examples, but in all cases vibrations are noticed when some adequate cause is sounding the key-note; if the velocity of these pulsations is altered, the vibrations due to that identical cause will cease.

The consequences of mill vibration in the power absorbed by its exertion in the continual straining of machinery and mill must inevitably tend to damaging results to plant and product.

Were not a lot of columns placed almost at random out of the question in a mill, we could make the statement that vibration could be diminished and nearly stopped by placing columns under the principal centres of vibrations, and so dividing the floor into still smaller areas of vibration.

The only sure method of prevention applicable to the future seems to be in the construction of one-story mills, with the shafting resting upon piers in the basement. The result in the additional speed without any disturbance of stability, and of the diminution of the repairs under the same excessive conditions, in mills constructed upon the one-story plan will hasten their introduction. In such a mill, if vibration should take place, it could be stopped by additional columns in the low basement without interfering with the machinery.

The swaying of a mill owing to oscillation is due to a lack of stability, and weak construction, and the only correction possible for such cases is to increase the strength by reconstruction of the weak portions of the building. — *C. J. H. Woodbury in the Manufacturers' Review and Industrial Record.*

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THE HYPÆTHRAL QUESTION.

To the Editor of the American Architect:

Dear Sir,— I have translated from the *Repertorium für Kunstwissenschaft*, Vol. 3, No. 1, the following favorable notice of Mr. Clarke's essay, "The Hypæthral Question," by Dr. Franz Reber, the historian of classical art. "Since Böttticher's refutation of Dr. Ross," he says, "the statements of Vitruvius on this subject have been generally accepted as authoritative, and there has been an inclination to treat any further protest against them as mere stubbornness. The practical difficulties, however, in the construction of the 'Hypæthrum' have baffled the ingenuity of the most skilful students and restorers of ancient architecture. Mr. Clarke's pamphlet is, in our opinion, successful, at least to this extent: that the existence of the hypaethral temple can no longer be considered an established fact."

He gives quite a full analysis of Mr. Clarke's arguments, accepting them without any criticism or doubt. He condemns only the attempt of the "really worthless" essay of Schultz to prove that Vitruvius was a mediæval monk. His closing words are: "Although many doubts yet remain unsolved, we have no hesitation in saying that the weight of probability is against the existence of the hypæthral structure."

X.

PUBLICATIONS RECEIVED.

Our Architecture and its Defects. A Critical Essay prepared for the Association of Architects of Washington, D. C., and delivered there December 22, 1879. By John L. Smithmyer, A. A. I.

Common Sense in Church Building. Illustrated by seven original plates. By E. C. Gardner, author of Homes and How to Make Them, Illustrated Homes, and Home Interiors. New York: Bicknell & Comstock. 1880.

Fifth Biennial Report of the Board of Capitol Commissioners to the Governor of Iowa. October 31, 1879. Printed by order of the General Assembly.

NOTES AND CLIPPINGS.

Good Books for Students. — The Royal Institute of British Architects recommends to students who intend to present themselves before its examiners the following list of books: —

Architectural Publication Society's Dictionary of Architecture. (Incomplete.) . . . . . I., III., IV., V.
* Baker, Land and Engineering Surveying. 12°. 1871. . . . II.
* Baker, Mensuration, 6th edition. 12°. 1867. . . . . II.
Barlow, Treatise on Strength of Materials. 8°. 1867. . . II., IV.
* Burnell, Limes, Cements, and Mortars. 12°. 1872. . . . IV.
Brandon, Analysis of Gothic Architecture. 2 vols. 4°. 1849. . I., V.
Burchett, Linear Perspective. 8°. 1871. . . . . I.
Chambers, Civil Architecture. (Various editions.) . . . . I.
* Dobson, Art of Building. 3d edition. 12°. 1871. . . . IV.
* Dobson, Foundation and Concrete Works. 12°. 1872. . . . IV.
* Dobson, Masonry and Stone-Cutting. 12°. 1871. . . . IV.
Dobson, Students' Guide to Measuring and Valuing, edited by Tarn. 1871. . . . . III.
Donaldson, Handbook of Specifications, with Glenn's Law of Contracts. 8°. 1859. . . . . III., IV.
Fairbairn, Application of Cast and Wrought Iron. 4th edition. 8°. 1870. . . . . IV.
Fergusson, History of Architecture in all Countries. 3 vols. 8°. 1865. . . . . V.
* Fownes, Manual of Elementary Chemistry. 12°. . . . . II.
* Gibbons, Law of Dilapidations and Nuisances. 8°. 1849. . . III.
Gregory, Mathematics for Practical Men. 4th edition. 8°. 1862. II.
Gwilt, Encyclopædia of Architecture, edited by Papworth. 8°. 1871. I., II., III., IV., V.
Laxton, Examples of Building Construction. 2 vols. large folio. 1855-58. . . . . I., IV.
Newland, Carpenter's and Joiner's Assistant. 4°. 1860. . . I., IV.
Noble, Professional Practice of Architects and of Measuring Surveyors. 1836. . . . . III., IV.
Normand, Parallel of the Orders of Architecture. Folio. 1829. . I.
* Portlock, Treatise on Geology. 12°. 1859. . . . II., IV.
Reid, Young Surveyor's Preceptor. 2d edition. 4°. 1871. . IV.
Rickman, Attempt to Discriminate the Styles of English Architecture. 6th edition. 8°. 1862. . . . . I., V.
* Smith (T. Roger), Acoustics of Public Buildings. 12°. 1861. . II.
Tarn, Practical Geometry. 8°. 1871. . . . . II.
Todhunter, Mechanics for Beginners. 8°. 1867. . . . . II.
* Tomlinson, Warming and Ventilation. 12°. 1868. . . . . II.
Tredgold, Elementary Principles of Carpentry (Barlow). 8°. 1870. IV.
Viollet-le-Duc, Dictionnaire d'Architecture. . . . . I., IV., V.

Explanation. The books mentioned are divided into five classes and belong to one or another class according to the indications of the Roman numerals attached. These classes embrace: I. Drawing and Design; II. Mathematics and Physics; III. Professional Practice; IV. Materials and Construction; V. History and Literature. The books marked with an asterisk belong to Weale's Rudimentary Series.

The Brooklyn Bridge. — The Executive Committee of the Trustees of the Brooklyn Bridge have just reported that of the entire estimated cost of the bridge, $13,708,026.60, $11,706,457.62 have been expended, leaving the estimated amount to complete the work $2,001,594.98. To this is to be added the estimates for advance in cost of materials, making the requisite amount $2,250,000. A bill will be recommended to the Legislature providing that New York be authorized to pay $750,000 and Brooklyn $1,250,000, for the completion of the work, the money to be raised by the issue of bonds.

The New Capitol at Albany. — The commissioners in charge of the erection of the new capitol report that the total amount expended to date is $9,600,681.65. The amount standing charged to this account on the books of the comptroller is $10,261,870.84. The difference between these two statements is assumed to be in the cost of land and other expenses incurred prior to the beginning of the construction account. Of the sum first mentioned $132,583.45 were paid for furnishing the completed portion of the building. The last appropriation of $500,000 for the continuation of the work was not made available, by the terms of the act, until the commissioners had filed a written certificate with the Secretary of State, to the effect that, after examining the estimates, plans, and specifications, they were satisfied the building could be completed at a further cost of $3,500,000 over and above that appropriation. This provision was complied with, and the commissioners claim that the record of work performed during the year demonstrates the correctness of their estimates and proves that if there shall be no considerable advance in the price of labor and materials the building can be completed for the sum stated. The commissioners are also of opinion that the prosecution of the work to the best advantage will require appropriations of $1,500,000 for the ensuing year, and $1,000,000 for each of the two years thereafter, and that the entire building can be made ready for occupancy within three years from this time.

Dilatory Contractors. — The contractors for supplying the iron for the roof of the new building for the Bureau of Engraving and Printing have got themselves into trouble and been brought up with a short turn by Secretary Sherman. The contract for the iron called for the delivery several weeks ago, and provided for a penalty of twenty-five dollars for every day it was delayed after a specified time. The iron was not delivered in accordance with the terms of the contract, and the work on the building has been set back several weeks in consequence. The contractors allege as the reason for the delay that iron has advanced in value very much since they took the contract, and that they have more orders on hand than they can fill, and that consequently the Government must wait. Secretary Sherman does not consider these reasons satisfactory, and has given instructions to enforce the penalty against the contractors for not complying with the terms of the contract. He is determined to see whether this will not hurry up the iron, so that the building can be put under cover, and the plastering proceeded with.

A Belgian Permanent Exhibition. — On the first of next May a permanent international exhibition will be opened at Brussels, the capital city of Belgium This year is the fiftieth anniversary of Belgian independence, and the occasion will be largely celebrated by various festivals, and a large attendance at Brussels is expected for next summer. The Belgian government is anxious that other nations should exhibit specimens of manufactured goods and art work.

Architectural Patchwork. — Bits of former great mansions in England are curiously scattered here and there. The columns of what is known as the National Gallery, in Trafalgar Square, once adorned the front of Carlton House, the famous abode of the Prince Regent, of which not a trace to-day remains; and the stone screen from the same palace now stands in front of the Duke of Westminster's London home. The staircase of the Duke of Chandos's residence, Canons, was bought by the lettered Lord Chesterfield for Chesterfield House, where it remains.

Robbing the Museum at Alexandria. — The Boulak Museum is the best history that exists of the Pharaohs, with their twenty-five dynasties, and the Persians and Greeks who followed them. Statues, pictures, ornaments, and, writings are all there to tell the story. But the *locale* is small and damp, and changes were projected last summer which required the closing of the museum for a time, and the packing away of all the valuables in cases until the alterations were completed. They were all deposited in a neighboring warehouse under what seemed proper guardianship. But robbers the other day broke in through the roof; and they must have been robbers of a certain rank of intellect, for some eighty or one hundred *scarabæi*, of great value pecuniarily and impossible to replace, as they related to the early dynasties, were abstracted, although they were things of no apparent worth to an ignorant person.

New Temple at Moscow. — The Khram Spaseetelya, or Temple of our Saviour, at Moscow, is now rapidly approaching completion. The building was begun so far back as 1833, and was designed in commemoration of the French expulsion from Moscow. Nearly 4,000 laborers, for a month, were employed in digging out the ground for the foundations, and considerable energy was displayed in building the base; but, after a while, operations languished, and the work has gone on by fits and starts, until it has now reached a stage when the architect can promise its completion next August, in readiness for the twenty-fifth anniversary of the Emperor's coronation. The height of the structure is 288 feet, and the style of architecture is the Russo-Byzantine, the building being in the form of a Greek cross, surmounted by five cupolas, one at each corner, and a large one, or dome, in the centre. The roof and the framework of the cupolas weigh 1,800 tons, and the gilding on the latter has already consumed more than half a ton of gold-leaf. Above the centre cupola is a massive bronze cross, which can be seen from every part of Moscow. The bronze frames of the windows, each nine yards high, weigh nearly three tons, and the hinges of the bronze doors have to support five and one quarter tons of metal. Inside, the walls are gorgeously decorated in the usual style of Russian churches, and contain a number of jasper pillars, each of which cost upward of £2,000. The total cost of this wonderful building is estimated to exceed 20,000,000 roubles, or £2,500,000. But this is not all. Recently the architect reported that a block of houses in proximity to the temple was detrimental to one of the aspects, and, as a mere matter of course, the Synod voted £200,000 to demolish the buildings, and to construct in their place a terrace. It must not be forgotten that this is the second great cathedral which Russia has raised during the last sixty years, the famous one of St. Isaac's in St. Petersburg having been begun in 1819 and consecrated in 1858, after an expenditure of 36,000,000 roubles, or £4,500,000. A third cathedral, not quite so large, is also rising at Nijni Novgorod, and will involve an outlay of £2,000,000 before completion. — *The Parisian.*

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A DIFFICULTY has been raised in the New York Board of Health which is somewhat embarrassing to architects who have striven for solidity of interior finish. Dr. Janes, Assistant Sanitary Superintendent, having inspected the additions to the new Court-House, has reported: "I found that the interior walls consist of brick uncovered by plaster or paint, and thereby present an absorbing and evaporating surface, which in my opinion is detrimental to the health of those who daily occupy these apartments." Brick walls, he thinks, are porous enough to absorb and filter out from the air they enclose the noxious vapors and organic impurities it contains, and to give them up when fresh air is supplied. When exposed, he says, they become in time filthy, and cannot be thoroughly cleaned by any amount of scrubbing. He therefore recommends that in this case they be covered with some material that will stop the absorption. We do not wish to argue against any reasonable precaution, but we think an apprehension of this kind may easily be overstrained. In particular cases, as in cells in which prisoners are kept closely confined, or in sick wards of hospitals, the porosity of wall surfaces is a thing to be carefully guarded against. For this reason, in hospitals where a wall is lined with brick glazed bricks are preferred. Perhaps the crowd which throngs a police court may be almost as profuse in unsalubrious exhalations as the wards of a hospital, and in such cases special precaution should be taken; but for ordinary rooms, or indeed for such rooms, we suspect bare brick to be as good as any of the materials that are in common use, inasmuch as a fair comeliness in interior effect leads to the use only of the harder, smoother, and more impervious kind of brick.

As for the common materials, ordinary plastering is more porous than a hard-pressed brick. A fine, hard finish, very thoroughly trowelled, may perhaps shed exhalations better, but its advantage disappears when it is covered with a wash of color or with paper. Unpainted wood is as bad in substance, and provides innumerable crannies and cavities which are worse. Granite and marble are more compact, but most kinds of stone are not. The only safe resource, then, would be in tiling, in some of the hard, impervious cements, or in paint and varnish, applied impartially to floors, walls, and ceilings. Curtains, upholstery, and carpets of course would be worse than anything else, and we may assume at once that they could not be tolerated in rooms from which bare brickwork was banished. These questions of comparison are questions which for the present at least it is all but impossible to settle by direct experiment, and in which, therefore, we are obliged to depend for our opinions on *a priori* reasoning; but it seems to us, on the whole, that, whatever care is necessary in the exceptional cases we have mentioned and other analogous ones, we have commonly no reason for dread of good hard brickwork or stone-work. In building for ordinary uses, instead of putting aside our growing preference for solid work or our precautions against fire, or of feeling obliged to take refuge in universal painting, we shall probably be safe in trusting to such freedom of ventilation as shall prevent foul air from lingering in our rooms, or shall rapidly carry off any unusual impurities, and in the customary appliances of cleanliness.

OWNERS of real estate in Chicago are disturbed by an ordinance which has just passed their city council. In the alarm that followed the great fire, and possibly stimulated by the discrimination of the better insurance companies against risks in the city, Chicago passed building laws which banished wooden buildings from her fire limits, and provided other wholesome restrictions. The effect was to make the new buildings of the city much more substantial and less dangerous than those they replaced. Since the alarm has worn away there has been a constant pressure in favor of relaxing the laws. The ordinance now brought forward allows wooden buildings sixteen feet high to be put up anywhere in the city. If it goes into effect, the result will be that a great deal of land which borders on the denser part of the city, and on which it is not now profitable to put buildings of a better class, will be brought into use for cheap wooden shanties. In these the poorer people of the city will swarm, and will provide the city anew with just the opportunity that led to the first great fire. Wooden sheds will also be interspersed among the better buildings in the heart of the city in such a way as may endanger them greatly. This not only invites recklessness, but is a breach of faith with the men who have been encouraged by the old laws and the security expected from them to put their capital into better buildings than the old, as well as with underwriters. The common argument for relaxation of building laws is that they bear heavily on men of little means, who must build cheaply, or not at all. This argument, we suspect, is generally pressed for more than it is worth. In the present case it appears to be not the poor men, but capitalists, speculative builders who wish to invest their money in cheap houses, and lumbermen who wish a market, that are behind the movement. One alderman, indeed, declared in council that he had made inquiry and found that the poor people of his ward were not in favor of the ordinance. It is a familiar saying that a burnt child dreads the fire, as it is a familiar fact that the fears of children do not last unless they are renewed. Chicago is a young city, and seems bent upon giving an illustration both of the saying and of the fact. The opportunity for renewing the fear will doubtless follow in due time.

THE latest Sessional Paper of the Royal Institute of British Architects contains the examination papers for the last year. The Institute examinations, to which, as we said a short time ago in discussing the qualifying of architects, it has been decided that after two years' grace from this time every candidate for the Institute must submit, are held every spring, provided candidates enough present themselves. They have been established sixteen or seventeen years, but have hitherto been purely optional, there being nothing dependent on them, we believe, but the certificate of proficiency which the Institute gives to those who pass. Inasmuch as the examination is entirely voluntary, and has led from nothing to nothing, it is not surprising that no large proportion of the architects in practice have undertaken them. Nevertheless, the fact that seventy-five candidates are on record as passed since the examinations were established indicates that they have not been without effect, and it is probable that they have had an influence through emulation over a much larger number. When the new rule of the Institute is enforced, and all architects who wish to be members of it are obliged to enter through the door of an examination, we shall see how strong an impetus it can give in this direction, and we shall have also a measure of the desire of architects to join the Institute. Thus far, it is to be noticed, there has been a decline in the number of candidates since the earlier years, at least in what is called the class of Proficiency. The examinations are now of two kinds: the Proficiency examinations, which date back to 1863, and the Preliminary examinations, which were begun in 1870, and are intended as introductory to the others, the first being biennial and the second annual. There is also an occasional examination in what is called the class of Distinction. We find a record of these classes in what is called the "brown book" of the Architectural Association, from which it appears that the average number which has passed in the successive examinations of the class in Proficiency has been four, and in the Preliminary class seven or eight. Between 1863 and 1877 seven examinations for proficiency were held, and we notice, not without a sympathetic regret, a pretty steady *diminuendo* in the candidates passed, the successive numbers being eight, seven, four, four, three, two, one. Whether this diminution was the cause or the effect, or merely the concomitant, of the establishment of the Preliminary class, which was begun in 1870, does not appear.

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The numbers in the Preliminary classes, on the other hand, of which six have been examined, do not show any such marked progression.

The examination papers of the last spring's classes are of interest for the indication they give of the English idea of an architect's education, and the relative importance they ascribe to its different branches. In each examination candidates are marked on a scale of one thousand, six hundred being required in order to pass in the Preliminary and seven hundred in the Proficiency class. The Preliminary examination includes drawing from the round, the subjects given being in this case a vase, a Gothic crocket, and an antique figure; a sketch from memory, a Doric capital and a Gothic buttress; and a geometrical drawing from memory, a classical entablature and a window of any period of English architecture. These exercises occupy the first day. Then follows a day of mathematics, which includes arithmetic, Euclid, and very simple practical geometry: then a day of examination on the use of materials, and one on history of politics of art, both confined entirely to English history, and ending with an architectural description of some important mediæval building in England. The examination for proficiency is more exacting. Drawing is taken for granted, excepting constructive drawing, and except that the applicant is required to exhibit a certain amount of work done at home and called probationary, including a measured drawing from some existing building, a perspective sketch of a like subject, and a plan, elevation, and perspective of a design by himself. The work is divided into two sections, artistic and scientific, each occupying three days of a week, and each being marked on a scale of one thousand, of which seven hundred is required in order to pass. The marks are subdivided among the subjects of the sections, and the minimum necessary to pass is varied, showing the rank assigned to the different branches. Thus, in the artistic section design comes first, with four hundred marks out of the thousand, of which two thirds must be won to pass; the history and literature of art have two hundred and fifty, only one third being required; perspective two hundred, and geometrical drawing one hundred and fifty, the minimum being one third. So in the scientific section, after the probationary work, including a set of working drawings with specification and details, we have for construction three hundred marks, two thirds required; materials, two hundred, also two thirds; mathematics (including arithmetic, algebra, and geometry) and physics, each one hundred and fifty marks; mensuration and professional practice, each one hundred, in all of which but one third are required for passing.

The quality of the examination deserves the notice of those who are interested in fixing a standard of qualification for architects in this country. To exhibit fully its intended scope would require a comparison of the papers of successive years, since but few questions can be asked on each subject in any one paper. But the questions before us imply a considerable amount of work, and are meant to lead over the whole ground of an architect's professional acquirement. There is always difficulty in so framing examination papers that they shall bring out the candidate's real knowledge and not be met by cramming, a point in which there is an advantage in such an oral examination as we referred to in noticing Mr. President Whichcord's opening address three weeks ago. The difficulty is pretty well met in most of the subjects of these papers by proposing problems for solution or questions for discussion which would call for thought and knowledge of his subject on the part of the candidate, unless they were specially adapted to a formal routine of study laid out beforehand. Here the problem in design for the Proficiency examination is a cemetery chapel, which is somewhat quaintly prescribed to be "in any style of classical or other historically Christian architecture." The problems in physics are the equilibration of a polygonal roof and of systems of weights and pulleys. Those in construction include questions of foundations, of proportions of piers and buttresses, of the framing of a trussed partition with three doors, of a king-post roof of thirty-six feet span and a queen-post roof of fifty feet; the design of a cast-iron girder, of a wrought-iron box girder, an iron column, etc. One thing which strikes the reader as in marked contrast with the practice of all the continental schools, and with the practice of England herself half a century ago, is the almost absolute neglect of classic styles. Beyond the alternative we have quoted in the problem of design and the drawing of an Order from memory in the Preliminary examination, there is hardly a recognition of the existence of classical architecture, or mention of any ancient form or example of building. Indeed, we are struck in the references to the history and literature of architecture with what we are tempted to call a certain insularity of view, almost all the questions being confined to English mediæval architecture and history, and no hints being given of the interdependence of styles or the development of forms, or of the influence of other countries than England, except in the alternative questions on Italian Renaissance. We do not say that this is not justifiable in a scheme which aims simply at encouraging the practical efficiency of the architects of a particular nation, but it does not lead to the breadth of cultivation which is desirable in our profession at this day, nor does it follow along with the actual acquirements of the better trained English architects.

Another point which is conspicuous is the curious simplicity of the mathematical papers, the examination stopping short altogether, especially in geometry, of the point where knowledge of the subject would be useful. There is no practitioner — hardly even the engineer — to whom what we may call a geometrical habit of mind is so important as to the architect; and to him, dealing as he does almost exclusively with solid forms, with intersections of planes and solids, and of lines with both, of curved surfaces, and problems of stone-cutting, geometry which stops at two dimensions is almost as inadequate as to know how to multiply but not to divide would be to a computer. To be sure, the habit of drawing constantly from the round and for it, gives architects a good deal of intuitive perception of the relations of form; and rules of perspective, practised but not understood, help him graphically out of many difficulties; but the free handling of combinations which comes of a ready knowledge of geometric relations, and the robustness of imagination which it gives, are apt to fail him. In these examination papers the geometrical examples are confined to a few rudimentary properties and simple problems of plane figures, such as might serve in any school examination, and such devices of perspective as are commonly learned by rule of thumb; the amount of geometrical knowledge presupposed might occasionally be of some practical convenience, but could hardly have any influence on the architect's mental habit. In fact, the technico-scientific side seems to be the weakest side. One could believe, from the character of these geometrical papers, from the use of cast-iron girders, and from constructive designs that we find in English building papers, that the study of descriptive geometry or of graphical statics, and the use of modern methods of framing had not yet been accepted by English architects. We observe also a noticeable neglect of the subject of sanitary precautions, ventilation, drainage, and the like. In a general comprehensiveness, nevertheless, in the careful attention to practical conditions, and the readiness for actual work in both design and construction, which they seem to presuppose in the successful candidate, these papers are exemplary, and deserve the study of those who are interested in the qualifying of architects. Even in the preliminary papers we find much that would be a stumbling-block, we fear, to a large number of architects in practice in this country.

A glance through the annual report of the Architectural Association, to which we have just referred, and to which we may have occasion again to refer, shows the secret of the success of this society to lie in its programme of operations, definite, well arranged, purposeful, and well carried out. Our attention has been especially attracted by an appendix, which enumerates the opportunities, besides those offered by the two architectural societies, that enable the architectural student to fit himself for his profession, — opportunities of which we have as yet no equivalents. First, the Royal Academy, with its seven years' curriculum; its lectures on architecture, science, and art, by such men as Barry, Woolner, Armitage, Marshall, and Barff; its medals and travelling studentships; and its valuable collections and library, gives opportunity at once for individual and associated study. King's College, London, provides, under the conduct of Professor Kerr, lectures on the arts of construction, while there are classes, both day and evening, in drawing, in descriptive geometry, and in levelling and surveying. University College, London, also maintains courses of weekly architectural lectures, this year delivered by Mr. T. Roger Smith, holds examinations, and awards medals, prizes, and certificates. The Royal Architectural Museum and School of Art,

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which owes its being to the enthusiasm of Sir Gilbert Scott, has its regular drawing and modelling classes, its sketching club, its prizes and exhibitions. And, last, the National Art Training School, at South Kensington, has its classes in drawing of all kinds, and occasional lectures. It is the profiting by these advantages, as well as the dumb influences of surrounding architectural work of acknowledged merit, which secures for the English draughtsman, who may stray to this country in search of work, such satisfactory rating, — more satisfactory, we imagine, than he would receive should he remain at home.

WE are glad to do justice to the authorities of Palo Alto County, Iowa, to whose proposal for plans of a county jail we alluded in our number for November 29, 1879, and at the same time to give an account of the matter that is more encouraging to the profession. Whatever may have been the intent of the original proposition of the Board of Supervisors, which perhaps we misunderstood, and however inadequate the sum first offered, even if only as a premium in competition, we are officially informed that the selected architect gets five per cent on the contract price of the building for his plans and superintendence. At the same time we will correct a mistake into which we were led some time ago in copying a letter from another journal. On November 1, 1879, we quoted, under the head of a Prehistoric Excavation, an account of a remarkable cavern, adorned with paintings, discovered near what are called Chimney Pierre Rocks. The account, which should have been dated from Vincennes, Ind., proves on examination to be a hoax: no such cavern is known to exist.

SOME CAUSES OF FAILURE IN AMERICAN ARCHITECTURAL DESIGNS.[1] I.

ALLOW me to say a word or two as a preface to the paper which I am about to read.

Some exception has been taken to the title which I have given it. It has been intimated to me that the inference might be drawn from the words "some causes of failure in American architectural designs," that I intended to imply that all American architecture was a failure. I own that I do not, as a whole, consider it a success.

In discussing the subject we must take the architecture of America as a whole. We cannot discuss the work of a few cultivated men and call this American Architecture. We must take the mass of buildings as we find them, and if the majority of buildings in this city, for instance, is good, then I do not know in what good architecture consists. I would not have the temerity to say that the first half of my paper was applicable to members of the Institute, for were I to do so, the injustice in many instances must be apparent; but the number of men practising what is called the art of architecture spreads far beyond the limits of our Institute, and if we cannot apply any of these strictures to ourselves, I am quite sure we can each one of us find many feet which these shoes will fit most snugly.

I propose to state what seem to me some of the causes which make the faults of architectural designs in this country possible, faults resulting in those blots which form rather the rule than the exception in American architecture. The question is a broad one, and the more thought one bestows upon it the greater seems to be the importance of our acceptance of the answer given.

The most superficial glance backward through the last ten years cannot fail to give encouragement to a hopeful architect, one loving his art and wishing for its full success. That progress and advancement have been made will not for a moment be denied, and is it not equally undeniable that still greater progress is both possible and desirable? I may be accused of making a pessimist's statement if I say that for every ten failures made a decade ago only eight are made to-day, for possibly the ratio may be greater in favor of the present, but in looking through the architectural journals, or in walking the streets of this or other American cities, one is hardly tempted to make a more favorable criticism.

And whose fault is it that no better work is done? Is it the architect's or the public's, and are there other causes beyond these and beyond the architect's control? Is this prolific sowing of tares his fault or his misfortune, and is he alone to be blamed for the low standard which he has set up as the criterion of this art, which it should be his glory and his honor to foster? I am inclined to answer that a very full share of the censure must rest with the architects; they cannot withdraw themselves from the discussion as innocent parties, to the hem of whose garments no blame is attached.

That there are other causes beyond their control, at least for the present, must be granted, but with them we have now less to do. I will try to state them later on, that their bearing and influence may be properly seen. They are not to be removed in a day, and if they be removed at all, their removal will follow the correction of those faults in design for which the architects are alone responsible. Let us then look this matter seriously in the face and admit, with others outside of this Institute, our share of the responsiblity. Let us admit that we and others are partly, even largely, to blame for the indifferent position of architecture in this country, and, seeing our error, do what we can to remedy it. I will divide these causes of failure into two classes: first, those causes over which the architect has control, and he having control must therefore be held responsible for his failures; and, second, those causes over which he has no absolute control, and hence he can be held as only remotely responsible. I am persuaded that were he to remove those causes of failure for which he is responsible, it is only logical to conclude that the second class of causes would in time be removed of themselves.

But so long as the profession continues its present course in relation to architecture, so long as it permits itself to practise the art handicapped by disadvantages, the removal of which rests solely with itself, it is but fair that it should be the object of that contempt which nine tenths of its efforts create, and it alone must be to blame for the disfavor with which the art is regarded. The architects are slowly, but surely, building up a monument to their incapacity, a monument which ignorant and thoughtless people may admire and copy; but architecture as an art will be as dead as their imaginations, and will be a byword and reproach in the mouth of nations fortunate enough to have escaped from these fatal blunders.

First and foremost of those causes of failure over which the architect has control is want of proper and thorough preparation to practise the art which he has chosen as the work of his life. Half fledged, with a meagre preparation in some architect's office, picking up what crumbs may chance to fall from the master's hands, crumbs often enough stale and mouldy, without taste or nourishment, and so worthless; learning, and learning imperfectly, too, the mere technique of his art, he plunges into practice to commit blunder after blunder, and to perpetrate such things as it were a sacrilege to call architectural works. What does he know of the underlying and stable foundations of all good work in the past? The book is closed to him. He is blind and deaf to the past, and to him Egypt and Greece and Rome, the Middle Ages and the Renaissance, so far as the principles or practice or living facts and processes are concerned, are only so many meaningless words, conveying no idea and presenting no possible point of departure for his own work. What does he know of the Greek column and entablature, of the Roman arch and vault, of the pointed arch of the Middle Ages, or of the use and reason of the pinnacle or flying buttress? What does he know of that great intellectual activity which was developed with the discovery of the art of printing, and which brought about the Renaissance, or of that new birth of architecture in England to-day? In any one of these phases exist endless principles, the full mastery of which should be the groundwork upon which to build up the fabric of his own practice. He knows them not, but upon the quicksands of his ignorance, and in the quagmire of his presumption and temerity, he attempts to raise a structure which justly and properly should totter and fall and bury him in its stupid débris — but it does not. Through this state of things a public slow to learn is led to admire his eccentricities, to applaud his grotesque antics, and to believe in this false prophet.

Or again, he may have studied with some zeal, and have given more time to master the various branches of his art than others have given, and still be entirely unprepared to cope with the task he has set himself. It matters not so long as he is incompetent through insufficient education; the result is, and always will be, the same. We may be sure that his work is of little value to himself, to the public, or to his art. Very possibly the majority of such architects, with proper preparation and thorough training, might have produced creditable works, creditable alike to their art and to themselves. But, without knowledge of the fundamental principles of architecture, they have recourse to tricks and artistic subterfuges, or aim at novelty, as if, perchance, to surprise the public into favorable attention; when of all emotions that of surprise is not the legitimate object of any art, or, if legitimate, is only so in a very subordinate degree.

How easy it is to be original! One might change the position of the sill and lintel with their concomitant decoration, turn columns upside down, or do a thousand other things never done before. The effect would be startling, to say the least. But originality with beauty is another and very different thing, and not given to many men to produce. Surely we have seen numberless instances in which the architect's ignorance of the essential principles of the art has permitted him to produce new and terrible results, scarcely less startling than might be produced by the reversal of these accepted forms. There is, of course, a reason for the cap being at the top of a shaft and the base at its foot, of a pediment being set over an opening and not under it, reasons which ought to be familiar to every one who sets out to practise; but ask many of these architects the reason why they design a column with its usual arrangement, and they will have no other reason to give than that they have always so seen it. Could we keep such persons within the limits of mere copying, and that from good models, at least little harm would come, if no good; but we cannot, nor would such a course ever help to the advancement of architecture. The very A B C must be learned, if we would combine letters to form words, and the rules of grammar must be at our command if we would combine these words properly and intelligibly. Do all architects, then, know the A B C, much less the grammatical rules governing the art they practise? It would be impossible to study properly

[1] A paper by Mr. W. A. Potter, F. A. I. A., read at the late convention of the American Institute of Architects, held in New York in October last.

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the history or practice of any phase of architecture and not become familiar with the principles which lay at its roots, principles on which it was founded and which make it possible, principles at once æsthetic and practical. Who can study a Greek temple or a Roman bath, and not be struck with the philosophic use of material in the one, and the philosophic planning as a means to an end in the other? These two buildings having been well studied, two principles will of necessity be fully understood and force themselves upon the architect, and he will thus learn the relation of material to form, and of arrangement to use. And yet how many instances are thrust into our notice every day, in which both these general principles are absolutely wanting. Whose fault is it if we see constructive principles governing the use of one material, and harmonizing with its physical qualities and capabilities employed, in conjunction with a material which can be logically used only in some other form? And whose fault is it when we see buildings built whose arrangement seems to have been made with no reference to the uses to which the building was destined? It is the fault of the architect who has come to his task unprepared, and whose responsiblity reaches much further than I would dare to say. And so follows a whole train of errors and failures. Blunder after blunder is perpetrated, calculated not only to retard the proper advancement of architecture, but to mislead public opinion, or, in the eyes of the few intelligent people who watch these architects, to cover the art with ridicule. Success (and by that I mean success in its highest sense, not a favorable public notice, but a doing of right and good work without regard to what an ignorant public opinion may say of it), success, I say, can never come in any great measure to a man unless he has convictions, and strong ones too, in relation to the work he has in hand. Be he politician, theologian, scientist, artist, or architect, he must have fixed convictions as to the right and the wrong of what he may do or teach. And who may be said to have convictions? Certainly not that man who is ignorant of the facts and principles of the art or science he may profess to practise. The broadest knowledge, the fullest acquaintance with facts and theories and principles, joined to sound judgment will give any man a reasonable ground-work on which to base his convictions; but no amount of good judgment will avail if he has not given careful study to facts, which make a judgment possible. So it follows that many architects coming to their work unprepared by an acquaintance with the æsthetic and scientific principles on which the art rests, ignorant alike of its practice in the past, of the merits of its different phases, of the reasons for the existence of its very details, — these architects are, I say, without any convictions whatever. To them nothing is, nothing ever can be, absolutely right or absolutely wrong.

Judgment and reason cannot do this work, for they have nothing to work upon. Mere taste, as fallible as it is questionable, is all they have to guide them, and on this broken reed they cannot with safety depend. The result with many, even intelligent, architects is a running after each prophet who may arise, who, with some force or genius, has the power to render an eccentricity or revival of form for the moment the fashion. Such architects blow one day from the east, and the next day from the west, the day after that from the north, and on the following day from the south. They have been infected by the novelty of four different styles of work, and have tried them all, but whether good or evil they know not, and following blind inclination they show themselves to be very architectural weathercocks. Could this be so if they knew anything of principles or their value? If a man has convictions upon the subject his work would be in the direction of, and governed by, these convictions, and practising one style he would reach such a point of excellence in its exposition or adaptation as education, and his natural gifts aided by experience, might allow. Architecture is a tentative art; it is not absolute. What do we know absolutely of the effect we are about to produce before we have produced it? We build up our errors of taste and judgment to remain in lasting stone. We have not the privilege of the painter, who may retouch his canvas, keeping it by him before it is perfect. We have no proof-sheets of our work to correct; nor are our words rehearsed, that at rehearsal we may correct our blunders. It is only through a series of failures of judgment that judgment is to be trained at all, and as we may never be sure of its being without fault, certainly it will never reach any reasonable degree of accuracy if we take up one style to-day, and another to-morrow, so having no experience in any one direction. We see this sort of thing every day, and if the architects who work after this manner were men of sound education, men of convictions, in fact, we should have fewer failures to deplore.

It is the learned men in all learned professions who place their profession where it ought to stand, and if the architects would wish to correct some of those faults which make failures in their designs possible, and to place the art of architecture where it has a right to be, mainly with them lies the power. Architecture is not an art of feeling alone. It is distinctly divisible into two parts, the scientific or practical, and the purely æsthetic. We cannot depend upon our feeling or taste, no matter how good both may be, for underlying all work are immutable and eternal principles of right or wrong which we ought to and must be familiar with, principles which are inseparable from the component parts of the art, correlative and mutual and to be understood and mastered if we would combine those elements which in the combination of the scientific and the æsthetic create and form the art whose servants we claim to be. Let us then acknowledge, as we think we must, how many failures result from ignorance, and, admitting this, the remedy is at once found.

THE ILLUSTRATIONS.

"THE VANCORLEAR," NEW YORK, N. Y. MR. H. J. HARDENBERGH, ARCHITECT, NEW YORK, N. Y.

The building was built by Mr. Edward Clark, and completed November 1, 1879. It has a frontage of 200 feet on Seventh Avenue and 100 feet on both Fifty-fifth and Fifty-sixth Streets. The materials of the front are Philadelphia brick and Dorchester stone, with a sparing use of terra-cotta. The chief feature of the plan is the court, which has an area of about 3,500 square feet; the level of this is the same as the basement floor, and is reached by an inclined driveway outside of the building. The construction is fireproof throughout. The finish is of hard woods. The building returns a fair rate of interest to the owner at rents varying from one thousand to fifteen hundred dollars.

HOUSE FOR F. B. PORTER, ESQ., NEWPORT, R. I. MESSRS. POTTER & ROBERTSON, ARCHITECTS.

A PORTION OF RIEVAULX ABBEY. DRAWN BY MR. D. A. GREGG.

ROMANESQUE ARCHITECTURE. I.

[The following article, by Mr. E. A. Freeman, was originally published in an English magazine, half a dozen years ago. It is not, so far as we know, easily accessible to students of architecture in any convenient form, and since it contains the best account that we have ever seen of the real position and office of the Romanesque in the development of architecture, we shall quote the essential parts of it in this number and afterwards.]

As it is with the history of language, so it is with the history of architecture. To judge from the popular disputes about Law Courts and the like, people in general group all forms of architecture under two heads. The division which they make is closely analogous to the popular divisions into ancient and modern, dead and living, on other subjects. Architecture is supposed to be divided into two great styles, "Grecian" and "Gothic," and it is thought a very good joke to call the admirers of the supposed styles respectively Greeks and Goths. It is not very easy to find out what people who talk in this way mean by the words which they use; but it might seem that "Grecian" architecture pretty well answers to ancient history, dead languages, classical literature, and the like. It might seem that "Gothic" architecture, that is, the architecture of England, Germany, and France, pretty well answers to modern history, living languages, and so forth.

But, for my present purpose, I have nothing to do with the practical inferences which have been made from the vulgar classification, with questions as to the style of the Law Courts, or with recent controversies of any kind. I wish to point out that the same times, the same despised and neglected times, which the general historian of Europe looks on as the most important in the history of language, are also, in the same historical way of looking at them, the most important in the history of architecture. Alike in language, in law, in religion, and in art, the function of Rome was to leaven the whole world, and the most truly interesting period of Roman history was that when Rome was beginning to discharge her Imperial and Œcumenical office in all these different ways. That is to say, the form of architecture which has, not indeed the highest æsthetical merit, but certainly the highest historical interest, is neither the purely "classical" nor yet the purely mediæval style, but the style which comes between the two. Less satisfactory as a creation of artistic skill than either the pure Grecian or the pure Gothic, the intermediate form, the Romanesque, connects itself more directly than either with the general history of the world. It is the architectural language of those ages when the new world gradually grew out of the old, the ages which showed Rome as the true centre of the world and its history, the point to which all roads lead and from which all roads set forth. Laying "classical" prejudices aside, and looking at the matter from either an historical or a constructive point of view, we shall see that Roman and Romanesque are essentially the same thing. And more than this, we shall see that the Romanesque, the supposed corruption, is in many respects a real development or improvement on the earlier Roman. Or rather, the classical Roman is in truth a transitional and imperfect stage, leading the way to a more perfect form in the supposed corrupt and barbarous Romanesque.[1]

The only sound classification of styles of architecture is that which arranges them according to their leading principles of construction. Of such principles, as far as we know at present, there are only three; more accurately speaking, there are only two, one of which again falls into two great sub-divisions. The two great sys-

[1] I am here saying again a good deal of what I said twenty-three years ago in my *History of Architecture*, a book which I suppose is by this time pretty well forgotten. It was written when I was very young, and when I had by no means an adequate knowledge of examples. It was, moreover, colored throughout by ways of looking at things of which I have long taken leave. But I believe that I had even then fully grasped the true relations between the study of architecture and the general study of history, and most of the principles and classifications which are there laid down are such as I should maintain still.

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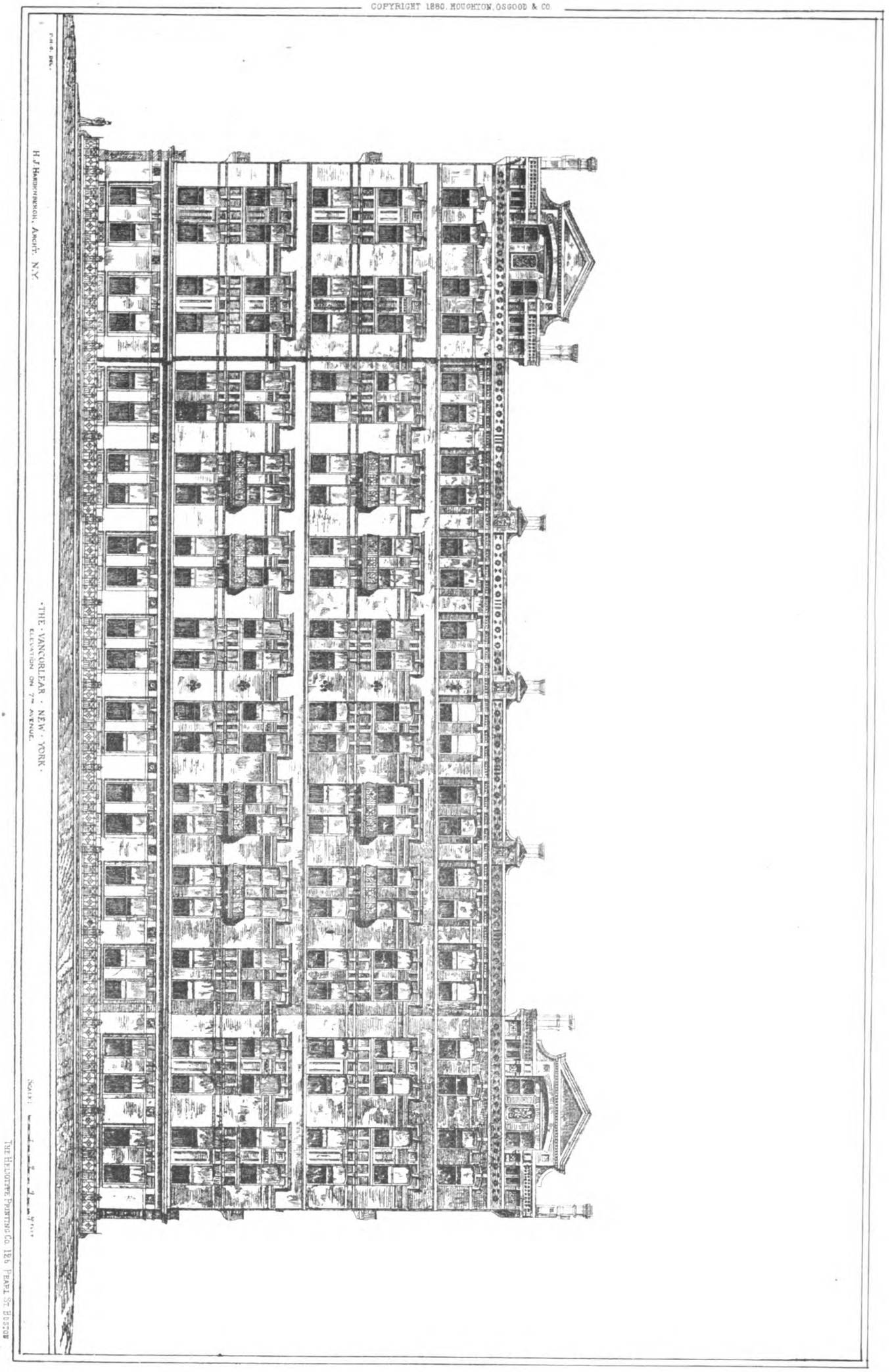

H. J. Hardenbergh, Archt. N.Y.

THE VANDERBEAR NEW YORK
ELEVATION ON 7TH AVENUE.

The Heliotype Printing Co. 18 Pearl St. Boston

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Jan. 1880.

House for F. B. Porter Esq., Newport R.I.

Potter & Robertson Architects.

52 W. 9th St. N.Y.

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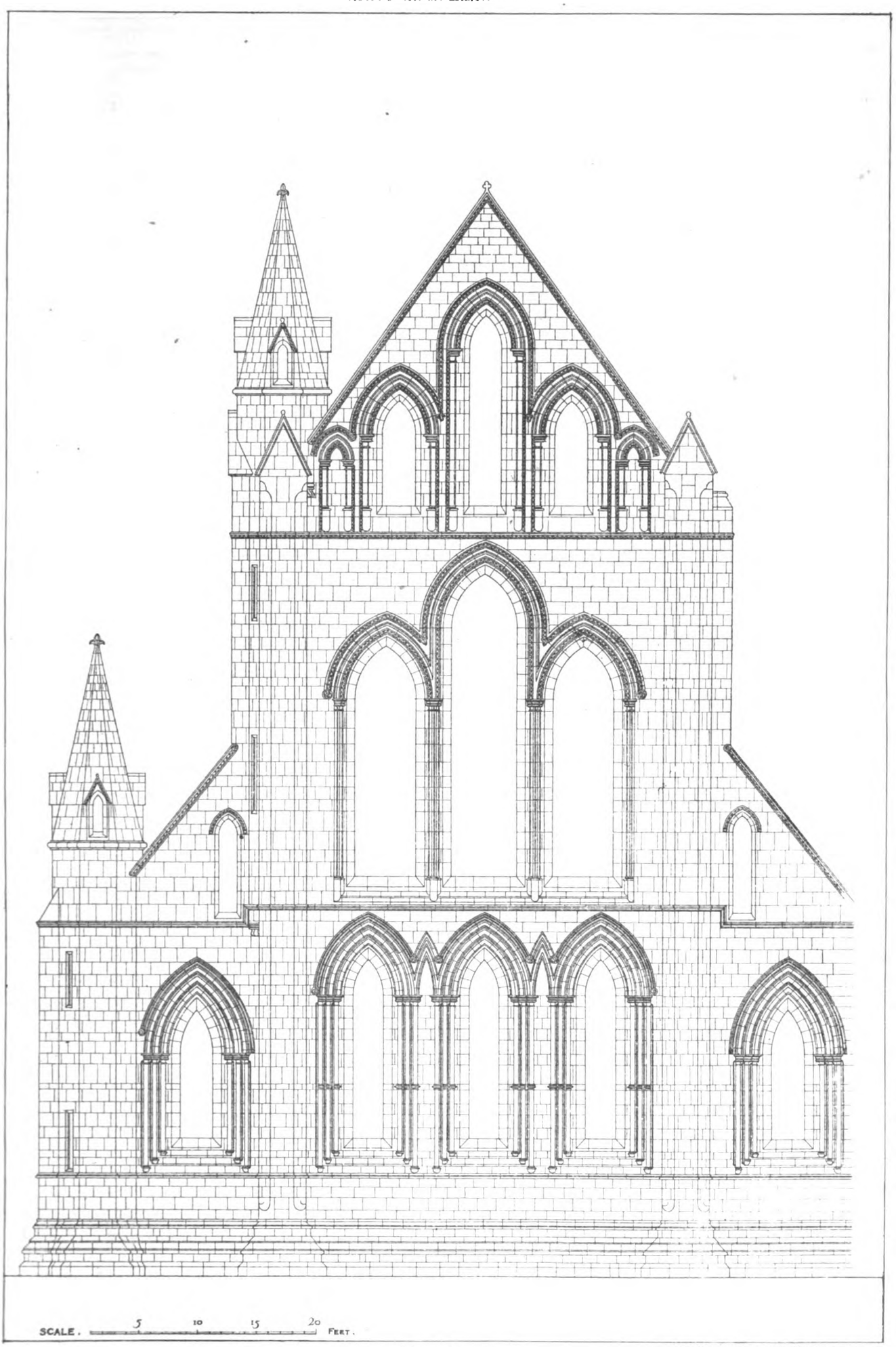

RIEVAULX

DRAWN BY D. A. GREGG

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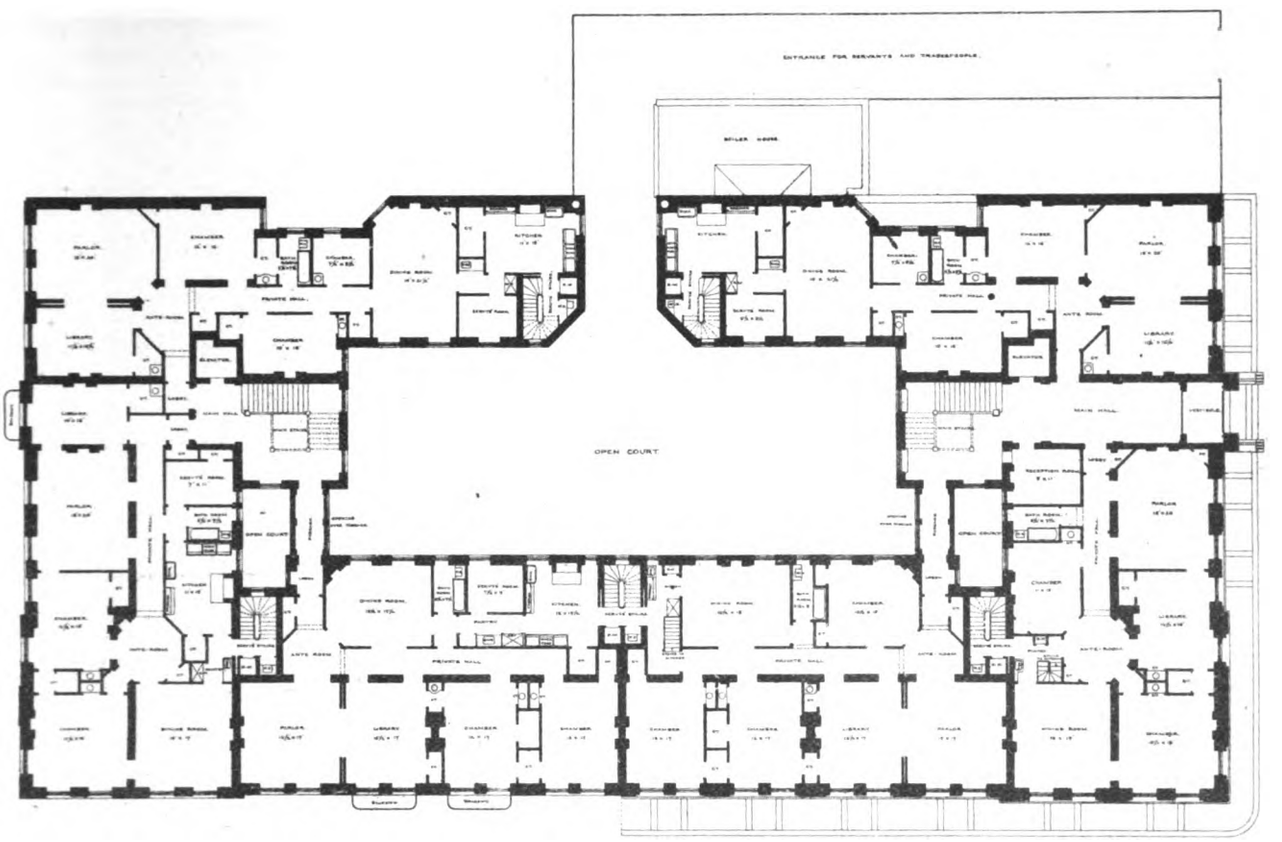
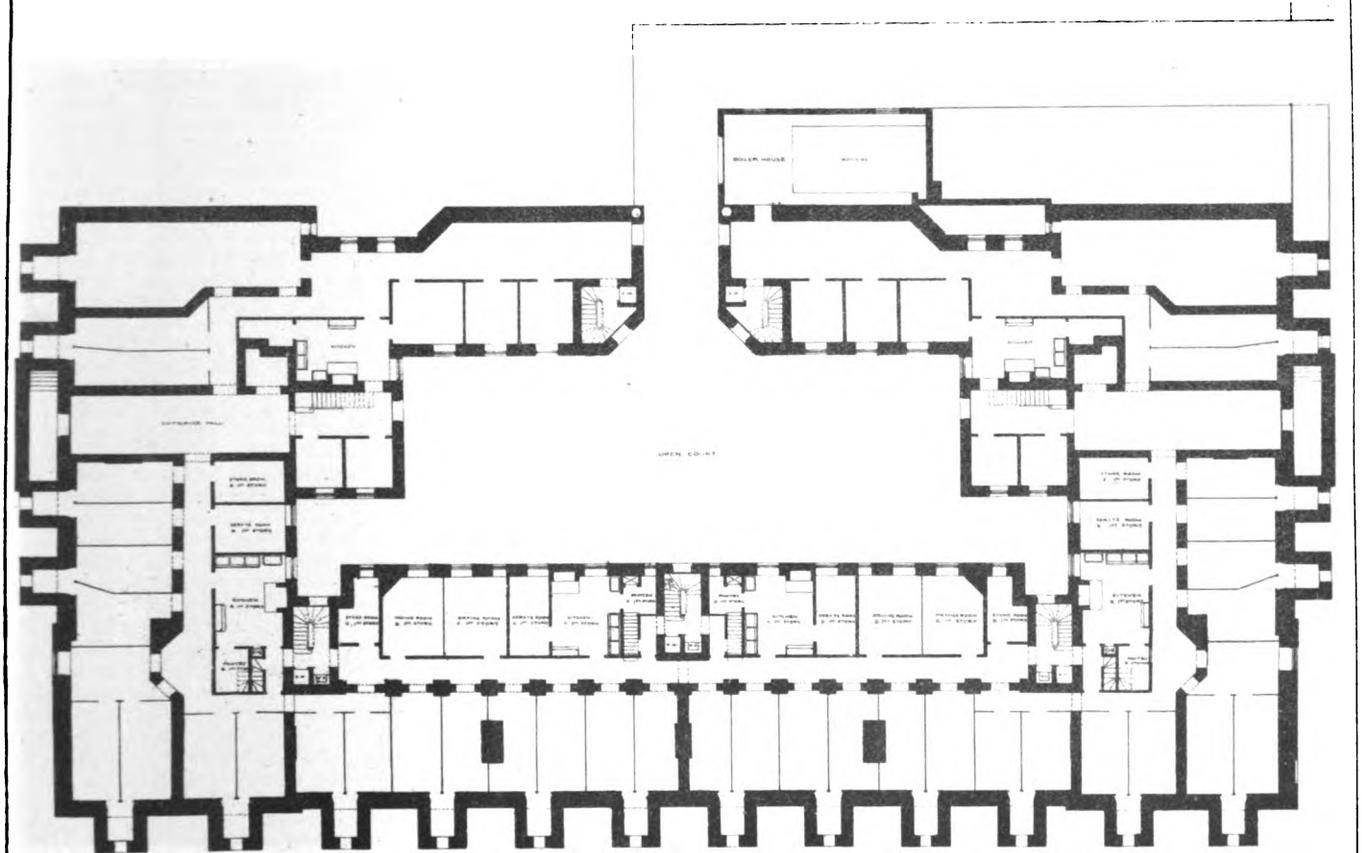


HALF PLAN OF UPPER STORIES

HALF PLAN OF FIRST STORY

7th Ave.



PLAN OF BASEMENT

THE VANDERLEAR.
H. J. HARDENBERGH, ARCHT. N.Y.

THE HELIOTYPE PRINTING CO. 114 PEARL ST. BOSTON

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tems of construction are the *Entablature* and the *Arch*, and the arch again may be either *round* or *pointed*. We thus get three distinct forms of construction, the Entablature, the Round Arch, and the Pointed Arch. And each of these principles of construction has been, in its own time and place, the animating principle of a style of architecture. That is to say, there have been times and places in which each of the three has not only been the prevalent form of construction, but has been accompanied by an harmonious and consistent system of decoration. Each of the three constructive principles may be looked on as the expression of an æsthetical principle. In the case of two out of the three this is generally acknowledged. It is universally felt that the architecture of the entablature is the expression of horizontal extension, that the architecture of the pointed arch is the expression of vertical extension. It is generally acknowledged that the perfection of the horizontal idea is to be found in the highest form of the architecture of the entablature, that is, in the architecture of old Greece. It is generally acknowledged that the perfection of the vertical idea is to be found in the highest form of the architecture of the pointed arch, that is, in the Gothic architecture of mediæval Europe. It is not so generally acknowledged that the intermediate form of construction, the round arch, has also its leading æsthetical idea. It is not so generally acknowledged that there have been times and places in which the round arch also has produced a style, not perhaps approaching so nearly to ideal perfection as either of the other styles, but still coming near enough to it to be set alongside the other two, as an independent and equal form of art.

Yet, if we admit the entablature, the round arch, and the pointed arch to be the three chief, and seemingly the three only possible, forms of architectural construction, it seems necessarily to follow that the round-arched construction must have its leading æsthetical idea no less than the other two, and that it must be capable, no less than the other two, of an ideal perfection. Whether it has ever actually reached its perfection or not, whether it has ever come so near to it as the other two have, is a question which is not now to the point. It will not do to say that there is a perfection of the arched style, but that its perfection must be looked for in the architecture of the pointed arch, and that the architecture of the round arch is an imperfect form. The answer is plain; the round arch is constructively as good a form of construction as either the entablature or the pointed arch. As a mode of building, it stands on a perfect level with them. Now, if we admit that all good and honest architecture consists in finding appropriate forms of decoration for good and honest forms of construction, it would seem to follow that every good and honest form of construction must be capable of finding some appropriate form of decoration, and of thereby reaching an ideal perfection. It seems then to follow that the architecture of the round arch has a right to be looked on as an independent form of art on a perfect level with the architecture of the entablature and the architecture of the pointed arch. Of course it does not follow that it has ever been actually carried so near to ideal perfection as either of the other styles. It is enough if we allow that it has, like them, its leading idea, and that it is capable of an ideal perfection. It seems, then, to follow that the architecture of the round arch has a right to be looked on as an independent form of art, on a perfect level with the architecture of the entablature and the architecture of the pointed arch. Of course it does not follow that it has ever been actually carried so near to ideal perfection as either of the other styles. It is enough if we allow that it has, like them, its leading idea, and that it is capable of an ideal perfection, whether it has ever actually reached it or not.

Some of the causes of the general unwillingness to admit the claims of the architecture of the round arch to an equal place alongside of the other two great forms are obvious enough. First of all, I am free to admit that the architecture of the round arch never has, as a matter of fact, been carried so near to perfection as both the other two forms have. There is no round-arched building so absolutely satisfactory as a work of art as either the best Grecian or the best Gothic buildings. In comparing Romanesque and Gothic buildings, a much greater share of the charm of the Romanesque building belongs to its age and its historical associations, a much less share to its actual merit as a work of art. I know not how others may feel, but to my own mind this is proved by the following test. A modern Gothic building, if it be really as good as an ancient one, is as satisfactory as an ancient one. But a modern Romanesque building is, to my mind at least, simply grotesque. The more closely it reproduces an ancient building, the more grotesque it becomes. This, I think, proves that, in the case of the Gothic building, we do, in the strictest sense, admire a work of art, while a great part of the charm of the Romanesque building is derived from other sources. But, if round-arched architecture has never been actually carried so near to perfection as the other two styles, that fact in no way disproves its abstract capacity of reaching an equal relative perfection. Secondly, though I believe the round-arched style to have a leading idea equally with the other styles, and to have equally with them an appropriate form of decoration, yet neither the leading idea nor the appropriate form of decoration is quite so obvious in the case of the round-arched style as it is in the case of the other two. There is something negative about all the characteristics of round-arched architecture. While the leading idea of the architecture of the entablature is that of horizontal extension, while the leading idea of the architecture of the pointed arch is that of vertical extension, I take the leading idea of the round-arched style to be that of no extension either way, but of simple rest and immobility. The round-arched form, again, has another peculiarity. No other can so well dispense with ornament. Either a Grecian or a Gothic building would be wholly intolerable, if it were so utterly void of ornament as many Romanesque buildings are which are perfectly satisfactory in their own way. Indeed, we may safely say that, the larger a Romanesque building is, the plainer it may be, perhaps ought to be. A small chapel in that style is commonly much richer than a great minster. What, too, is the nature of Romanesque ornament, when we get any? It is again something of a negative kind. The Greek mouldings are of a kind which serve to strengthen the horizontal lines supplied by the construction of the building. The Gothic mouldings are of a kind which serve to strengthen the vertical lines supplied by the construction of the building.

To admit the round-arched style as an independent form of equal rank with the other two involves giving up a whole train of notions about ancient and modern, classical, and the like. If we are to admit the claims of the round-arched style as I have put them, we must altogether wipe out the hard and fast line between ancient and modern. We must admit the continuous existence of a style whose earlier examples were the work of "classical" Romans, while its later examples were the work of barbarians, Goths, and the like. It would be hard to make many people believe that a really wider line ought to be drawn between two forms of mediæval work than between one form of mediæval work and one form of classical. It would be harder still to make them believe that one form of classical architecture ought to be looked on as a mere imperfect transition to a style which was brought nearer to perfection at the hands of mediæval barbarians. To those who take a wider view of general history there is no difficulty in all this. Sweep away the distinction of "ancient" and "modern;" cease to look on things "classical" as something all by themselves, hedged in from everything belonging to other times and nations; learn to look on history as a whole, and the history of Greece or of Rome simply as a part of that whole — and there will no longer seem anything strange or incongruous in holding that, in architecture, in language, or in anything else, the function of the first century on either side of our era was simply to pave the way for the eleventh or twelfth century after it. Once grasp the true life and spirit of the long imperial history, and there will seem nothing wonderful in fixing on the third century, in purely classical eyes a time of decay and degradation, as a time which alike in religion, in law, and in art stands out as one of the great creative ages of the world.

THE OPEN FIRE-PLACE. XX.

We pass somewhat blindly from one extreme to another. The opponents to the theory of "red-hot" permeability, and the dealers in cast-iron furnaces generally are convinced that the French Academy was mistaken, and that it is practically impossible for gases to pass through red-hot iron. In defence of their position they march out a small army of "distinguished" chemists, physicians, professors, and doctors of philosophy, who advertise liberally in behalf of the cast-iron furnace men that "cast-iron is no more permeable than wrought-iron;" that "any scientific chemist of experience must consider the exposition made in favor of wrought-iron much in the same light as a 'mare's nest;'" that "the result of analyses shows that carbonic oxide *has never passed through the metal at any time;*" that they cannot after three months' trial, working night and day, get the smallest particle of gas through the iron; that one has "never known such a thing as these gases passing through either cast or plate iron when used for heating purposes," etc.

Fig. 139 represents the Reynolds Wrought-Iron Furnace, one of

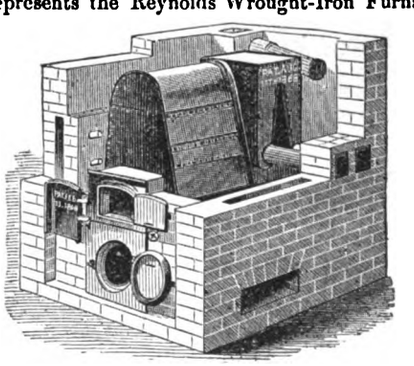

Fig. 139.

the most perfect hot-air furnaces now known. The doors are circular in form, with bevelled edges, turned to fit with the greatest nicety, so that they are as nearly air-tight as movable metal furnace joints can be made, and no check-draught door in the smoke-flue is necessary. This is a most important advantage, inasmuch as if no check-draught or damper be required in the smoke-flue, the pressure may be kept continually inwards or at least neutral at every part of the furnace. The radiating surfaces are well placed and large in extent.

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Fig. 140 represents Dunklee's Golden Eagle Furnace. In it hot air passes as well inside of the tubes as outside of the drum (not shown in the drawing), enclosing them and the smoke chamber, thus exem-

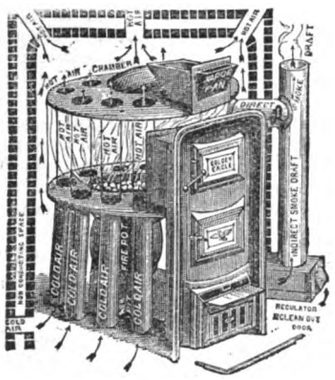

Fig. 140.

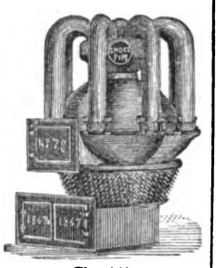

Fig. 141.

plifying both principles of circulation previously described. The tubes are of wrought-iron, and it is claimed that the greater expansion of wrought over cast iron tightens the joints when the furnace is

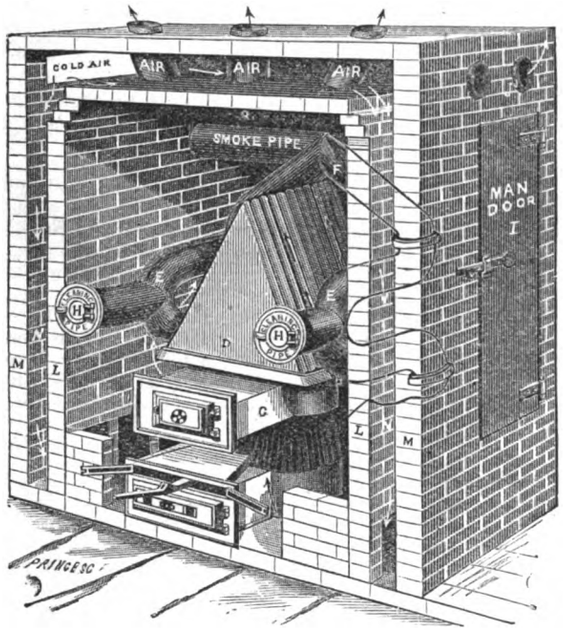

Fig. 142.

lighted and lessens the liability of leakage. The furnace has a large radiating surface and is a powerful heater.

In Chubbuck's Cast-Iron Furnace (Fig. 141) we have illustrated the principle of an increase of the heating surface by means of projec-

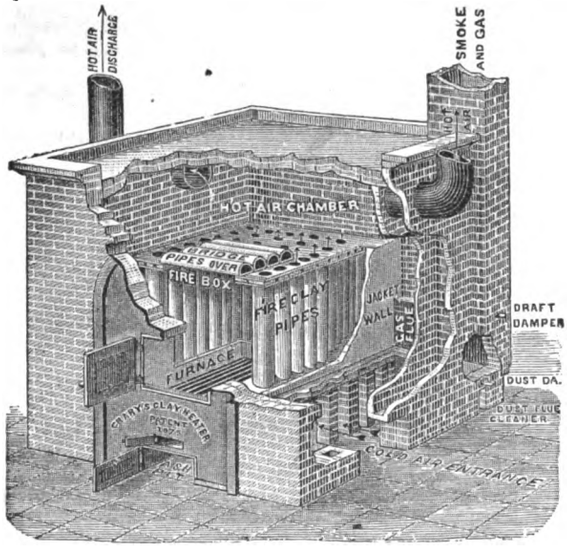

Fig. 143.

tions on the fire-pot, and in the Gothic Furnace (Fig. 142) by corrugations on the upper and lower radiating surfaces.

Terra-cotta is not permeable to gases when glazed or vitrified, but is exceedingly porous when partially or hard burnt without being vitrified. The Crary Clay Heater (Fig. 143) gives us an illustration of an American terra-cotta furnace.

Soapstone is altogether non-porous, and an excellent material for

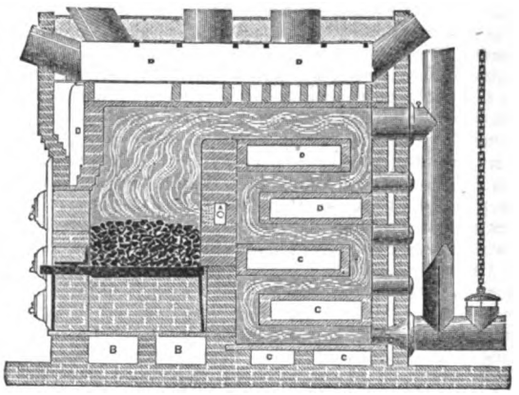

Fig. 144.

furnaces. The heating power of the furnace shown in Fig. 144, made by the Boston Soapstone Company, has proved to be much greater than would naturally be expected of material having so low a heat-conducting power.

THE VIGO COUNTY COURT-HOUSE.

To the Editor of the American Architect:

Dear Sirs, — Architects often wonder that the public and private citizens have erroneous conceptions of architectural affairs. Almost every practitioner has had some disagreeable experience in this regard. But when architects themselves fail to see clearly, and give *un faux compte rendu* to their guild, one feels no more like blaming common people and their attorneys for their extreme and adverse opinions. In the Vigo County Court-House case your correspondent accumulates an astonishing amount of errors and misrepresentations.

In your issue of December 20, 1879, your correspondent introduces the subject of the Vigo County Court-House by insinuating that I got myself and others into difficulty by my eagerness to obtain employment. The truth is that the Vigo County Commissioners came to my office, twice engaged my services in the project of erecting the court-house, and in the manner that other commissioners and all my clients have done. Never did I solicit any employment of Vigo County, and I do not propose to do it in the future. The commissioners I knew not. If they had not presented themselves at my office I would, perhaps, never have seen them. Thus Vigo County, by her Board of Commissioners, got me into difficulty, besides occasioning a large outlay of money, litigation, expense, trouble, bother, etc.

Without setting out the records, I wish to state that I had two claims against the county.

The first, a claim of one per cent for preliminary studies of a building estimated to cost $406,000, in the year 1872; the second, a claim of three per cent (not three and a half per cent, as your correspondent says) for preliminary studies, general drawings, specifications, a full and comprehensive set of inch-scale detail drawings, and about one half the full-size profiles. This in 1873, for an entirely different building, and ordered by the Board.

These two claims are very distinct. The first became a reality on the 10th of December, 1872, when the commissioners rescinded my contract and stopped my services upon the $406,000 building without consent. The second claim came into existence when the commissioners asked my services again, ordering another plan for a building, and adopting this plan the 4th of March, 1873, ordering it completed and agreeing to remunerate me as per schedule of charges of the American Institute of Architects.

The assertion of your correspondent that both plans were the same is a very great mistake. The records and the whole history of this court-house project are there to prove his error, without the help of the drawings and specifications of the two different plans, and a host of witnesses.

During the interim between these two contracts the Board of Commissioners, on the 17th of December, 1872, issued an advertisement for proposals to erect a court-house, not to exceed $250,000 in cost; each bidder to present his own plan and specification. The Legislature of Indiana, then in session, put a stop to this, enacting a law which made it obligatory on county boards to adopt plans first and exhibit them to the public for at least six weeks previous to letting the works.

In this particular move the commissioners ignored me entirely, and if this act of the Legislature had not been passed, I would have had no claim but on the first agreement, the one per cent for preliminary studies. The insinuation of your correspondent that it was intended to exclude all bidders and architects is wrong. County boards in Indiana may employ architects in any way they choose. There is no necessity for them to resort to any subterfuge. Where, then, is the reason for the insinuation that I was to associate my-

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self with a contractor to secure a job in collusion with the Board of Commissioners, to the exclusion of everybody else?

Both contracts in regard to payments were based upon the schedule of charges of the American Institute of Architects, and, entered by me in good faith on my part, were reasonable in all respects, and were cancelled by the Board without my consent. And here, again, your correspondent omits a very interesting part of the records.

To return to the first claim, I drew a set of study plans, upon the instructions of the commissioners, to wit, the usual county offices in main floor, a jail and sheriff's residence in basement, and three court-rooms with necessary appendages in the upper stories. The commissioners, upon the counsel of their advisers, — and they were numerous, — put this plan aside, as they were told that Vigo County was prosperous in wealth and population, and at some future time would need more court-rooms; hence a larger building would be desirable. This obliged me to prepare another set of study plans for a structure holding five court-rooms. That was the plan adopted December 2, 1872.

In accordance with the expert's definition of the term *preliminary sketches* are meant, — namely, "such sketches of a proposed building as an architect usually prepares in advance, for the purpose of arriving at a final and definite understanding with his client, and when the architect is finally employed to prepare the full drawings and specifications they are considered as forming part of such services and are not separately charged." I charged for them separately, as my first contract was rescinded by the commissioners December 10, 1872, and the next spring I was again employed by them to prepare plans for an entirely different building.

The study plans of a building to cost $406,000, which in its entrails was to hold a jail for forty-eight prisoners, a sheriff and jailer's residence, a full set of county offices, five court-rooms, with complete appurtenances, I consider a complex problem. Call such "*sketches* of a proposed building"! A few scratches made in advance, and, as three of the experts testified, without understanding the subject, ought not to be charged for! However, I look upon study plans in a different light. I consider them the most important part of an architect's performance. They are his composition, his creation. The more he understands of his subject the more time and pains he is likely to devote to the study plans. The final and definite understanding with his client is not all that the study plans contemplate. In a $406,000 building of the kind under consideration an architect has far more trouble to conciliate himself upon all points. For this reason instead of a few sketches I drew the plans of the four stories three times in succession, improving them at each study as a process of evolution. With these plans were drawn three sets of elevations, and transverse and longitudinal sections of the structure. So thoroughly was my work done that I could write a specification for the works which were to enclose the structure in every part. But here, again, comes the absurd statement of your correspondent that the commissioners did not know that the contract they let was only for the enclosing of the building! The letting of that contract was their business. They managed it, and for more than two hours they read to themselves, *viva voce*, the specification, which from beginning to end, and in every sentence, only specified the enclosing of the structure. It was thought best by them to defer letting the work for the full completion, as it would require more than two years to enclose the building.

I did fully and systematically all the labor embraced in the term preliminary studies, and by my contract for those services I was entitled to one per cent upon $406,000. This contract, like the second, was rescinded without my consent.

The second contract contemplated a building without any jail or sheriff's residence in the basement, and only three court-rooms. How this plan was the former your correspondent never explained. By the terms of this second contract, based upon the schedule of the American Institute of Architects, if all the drawings had been completed by the 10th of June, 1873, the date of the rescinding, I would have been entitled to recover three and a half per cent upon the cost. My labors, in this instance, embraced study plans, general drawings, specifications, a full set of inch-scale detail drawings, about one half the full-size profiles, and the duplicates of the general drawings and inch-scale drawings. The inch-scale drawings in this case were a full and large illustration of the general drawings in plan, elevation, and section, together with accurate horizontal and vertical profiles, some of the sheets for a single illustration being over seven feet in height. With these inch-scale drawings any ordinary assistant could have completed the full-size profiles left undone, and which I estimated at a half per cent out of the three and a half per cent due for a full set, making my second claim three per cent upon the estimated cost of $250,000.

The letting was advertised. Besides home mechanics, parties from Chicago, Dayton (Ohio), Indianapolis, Greencastle, New Albany, etc., proffered bids. These were left to the care of the auditor of the county, and alone could have told the cost of the court-house. The terms were that the commissioners would let the whole in a lump, if such bids were lower than the aggregate of the proposals in detail.

When the time for letting arrived (June 3, 1873) there were nineteen proposals, none of which were opened, as a new man came on the Board, which made a majority against building a court-house, and the order to build, together with my contract, was rescinded.

In short, the Board of Commissioners employed me to prepare plans, drawings, etc., for a court-house to cost $406,000, and made a written contract agreeing to pay me for services in the erection of the building according to the schedule of the American Institute of Architects. I had earned justly one per cent under that contract when it was rescinded, and was left without a cent of compensation.

The next year I was again employed by the same Board to get up a different plan for a different building, under a new law that had been passed. I did so. My plans were adopted. I was again employed as architect to complete the building, to be paid by the schedule of the American Institute of Architects, and after myself and assistants had worked for more than five months my contract was cancelled because the county did not want to go on and build a court-house.

My services under the two contracts, with interest thereon since 1872 and 1873, would, at the lowest estimate, amount to about $14,000.

Now, after seven years, in which I have been to great expense, litigating with a wealthy county, which I am informed has paid out over $2,000 in trying to beat me out of my just earnings, I receive a verdict for $10,425. I will be compelled to law this for years through the Supreme Court.

I have ever been ready and anxious to make a fair compromise, but this having been refused, I go to the court and intend to see whether an architect, under fair and honorable contracts, has any rights that a county board is bound to respect.

Very respectfully yours, J. A. VRYDAGH.

ARCHITECTS' CERTIFICATES FOR PAYMENT.

MILWAUKEE, January 2, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — I don't know that you have seen a decision given in the English High Court of Justice, Common Pleas Division, March, 1879, Stevenson *vs.* Watson. A lawyer friend handed me the *Central Law Journal*, bearing date July 25, 1879, published at St. Louis, where you will find the case reported at length. It is condensed as follows: —

"A company employed the defendant as their architect to design and supervise the building of a hall. The plaintiff undertook to build the hall, and the contract to build was signed by the company and the plaintiff, the defendant being no party thereto. The contract stipulated that the defendant should be at liberty to make such additions to, and deductions from, the original plan as he might deem advisable; the remuneration for such alterations to be estimated by him in a certain manner; all matters in dispute were to be left to the defendant, whose decision was to be final. The statement of claim alleged that, during the progress of the work, the defendant gave certificates from time to time, and the plaintiff thereupon received payment of various sums; but that in estimating the final balance due to the plaintiff, the defendant did not use due care and skill in ascertaining the amount to be paid to the plaintiff, and neglected and refused to ascertain the amount of the additions to, and deductions from, the original plans in the manner stipulated for, and 'knowingly and negligently' certified for a much less sum than was really due; and it was further alleged that, when the error was pointed out by the plaintiff, the defendant refused to reconsider his certificate. *Held*, on demurrer, that the duties of the architect were not such as could be deputed to an ordinary clerk, but called for the exercise of professional judgment and skill; that no fraud was charged against him, and that accordingly the action would not lie.

"Per Lord Coleridge, C. J. The plaintiff had taken the defendant for better or for worse, not as an arbitrator, but as a person whose opinion, as a condition precedent, he had to obtain before he could get a sum of money; and this being so, the plaintiff could not bring an action against the defendant for refusing to give the grounds of his opinion or to reconsider it.

"Per Denman, J. The defendant, though not exactly an arbitrator, was in a position very analogous to that of an arbitrator."

My friend thinks the case of importance to the profession, as he says in his note to me, "Coming from the English High Court of Justice, and the several judges concurring mainly, makes it a case of weight." I perfectly agree with him and therefore invite your attention to it.

Yours truly, A. BATE.

THE MECHLIN MARKET-HALL.

NEW YORK, January 16, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — In the number of the *American Architect* for January 10 you give a view of a group of buildings at Mechlin or Malines, situated a few miles from Brussels, with no explanation of the same. From my guide-book (Baedeker's), used on a visit to Belgium in 1878, I quote the following: —

"The place still boasts of several mediæval buildings. The old Cloth Hall, begun in 1340 but left uncompleted, with a small tower of the sixteenth century, is now used as the Guard House. [Note the grated windows in the engraving.] To the left of it are remains of a late Gothic Palais de Justice, begun by Keldermann in 1530."

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The last mentioned building appears to have been left in an incomplete condition some years, and then roofed over, the upper stories being used as a dwelling, and the lower one converted into shops.

The engraving fails to convey the picturesqueness of the original on account of the firmly drawn lines of the roofs, windows, and street corners.

At the time of my visit the large square in front of the Guard House was being filled with booths, tents, travelling houses on wheels, much like a photographer's car, etc., preparing for a grand fair, to happen the following week, and I sketched the scene with my back to the Guard House, choosing that view on account of the picturesque buildings and the Cathedral, which formed a striking background to the lively scene in front.

Very truly, L. W. Seavey.

OUTSIDE COMMISSIONS FOR ARCHITECTS.

[We give the benefit of publication to the following advertising letter, which has been forwarded to us, and was addressed to a person who, being an architect, is not a dealer.]

Dear Sir, — We beg to invite your attention to our marbleized iron mantels which are now so extensively used. They have proved a complete success in every way.

We would especially invite your attention to our Hackett Patent Grate, illustrated and explained on pages from 39 to 49 inclusive.

We recommend this grate to you for its superior heating power, economy of fuel, and cleanliness.

We have a very complete line of frames, fenders, summer-fronts, baskets, and blowers on hand, and any orders for repairing or replacing that you may send us will be promptly attended to at reasonable rates. *We offer you liberal commissions on all sales made by you.* Please favor us with a call and examine our samples.

Very respectfully, Bennett & Walcott.

CAST-IRON IN FURNACE CONSTRUCTION.

Boston, January 19, 1880.

To the Editor of the American Architect:

Dear Sir, — I notice in your issue of January 17 an article on the open fireplace in which the properties of cast-iron as a material for heating furnaces are discussed, and where certain facts and experiments are adduced to show its porosity or permeability under a pressure of several atmospheres. I do not wish to appear as the advocate of cast-iron as the best material for stoves, but I believe in giving everything a fair chance, and do not believe in the course of reasoning which is adopted in this article. In the first place, it does not seem to me to follow that because cast-iron is permeable under a pressure of several atmospheres, it must be also permeable at a pressure of eight millimetres of water, which is about one twelve hundredth part of an atmosphere, or one twenty-five hundredth part of two atmospheres! Although such a deduction is not expressed in so many words, it is left to be inferred from the tenor of the article referred to.

Again, the outward pressure measured by three to eight millimetres of water, as quoted, seems to me to be due to the fact that the furnace in question had no escape for gas and smoke at the top of its dome, but only at its base, near the floor. This is not the case in all furnaces, and must be considered as a defect in all where it exists, for this very reason, that it allows an outward pressure to exist all the time from the upper part of the furnace which might be avoided if the smoke-pipe were connected near the top. Now, whatever the material of a furnace may be, it is not an easy matter to keep it perfectly air-tight at the joints for any length of time after subjecting it to such excessive alternations of temperature as furnaces always must endure, so it seems to me best to construct them in a way which will avoid the pressure of gas from within outward so far as possible, as a measure of prudence. All furnaces that have the smoke-pipe attached near the base must needs have an outward pressure from the dome, which acts like a balloon, only its skin is rather too heavy to allow it to soar upward. The contents are always pressed upward by the atmospheric pressure below, acting through the fire, and as the column of air outside is heavier than the column of same height of heated gas inside, the latter shows its tendency to escape upward as indicated by the manometer in the experiment quoted. If in that experiment the smoke-pipe had been attached at the top of the dome, giving a free escape for the buoyant gases at that level, I feel pretty confident that the pressure would have vanished, and a good chimney draught may turn it in the other direction, namely, inward instead of outward. Edward S. Philbrick.

PUBLICATIONS RECEIVED.

Experiments on the Strength of Wrought-Iron and Chain-Cables. Report of the Committees of the United States Board appointed to Test Iron, Steel, and other Metals, on Chain-Cables, Malleable Iron, and Reheating and Rerolling Wrought-Iron, including Miscellaneous Investigations, with the Physical and Chemical Properties of Rolled Wrought-Iron. By Commander L. A. Beardslee, U. S. N., Member of the Board and Chairman of the Committees. Revised and abridged by William Kent, M. E., formerly Assistant to the Committee on Alloys of the United States Board, Associate Editor of the *American Manufacturer and Iron World*, Pittsburgh, Pa. New York: John Wiley & Sons. 1879. Price $2.00.

American Water-Color Society. Catalogue of the Twelfth Annual Exhibition. With illustrations. 1879.

NEW JOURNALS.

With the new year another periodical enters the field of independent journalism, and assures its subscribers that fearlessly and conscientiously its editor, Dr. P. H. Vander Weyde, will uphold the purity of its columns against the wiles of the promoters of fraudulent enterprises and the blandishments of the advertiser who expects three or four *quids* for his *quo*. For eleven years Dr. Vander Weyde was the editor of the *Manufacturer and Builder*, so he probably understands the difficulties that will beset his course in making the *Practical American* as independent as he would have it be. As Dr. Vander Weyde is the proprietor as well as editor, his course will not be obstructed by the lack of harmony and division of counsel that might otherwise arise. As might be expected from his long connection with that journal, the *Practical American*, which is to be issued monthly, is essentially like the *Manufacturer and Builder* in appearance and material. We trust that in succeeding issues there will be less carelessness shown by the proof-readers.

Another familiar visitor appears in a new dress. This time it is the journal, not the editor, which assumes new attire. The *American Builder* will henceforth be known as *The Builder and Woodworker*. Beyond the change of title and title-page, we do not perceive any alterations which call for mention.

NOTES AND CLIPPINGS.

Governor Cornell on the Capitol at Albany. — In his inaugural speech Governor Cornell said: "As a member of the New Capitol Commission in 1868, my most earnest endeavors were made in opposition to commencing the Capitol, in the belief that it could not be constructed within the limit of $4,000,000, as then fixed by the Legislature; but the commission decided to proceed, and the building was begun. The work has progressed under appropriations by successive Legislatures, notwithstanding the pronounced objections of the last three executives, until it is now so far advanced that there seems to be no rational course left but to provide for its completion in the most advantageous manner possible. In this view it is suggested whether it may not be best to provide the necessary means by a loan under the twelfth section of article seven of the Constitution, by which arrangement a portion of the burden would be placed upon the future tax-payers, who will enjoy the use of this grand but costly edifice."

The New York Sanitary Bureau. — The reality of the service rendered to the city of New York by the Sanitary Bureau of the Board of Health is shown by the following record of the work performed for the week ending December 27, 1879: The total number of inspections made by the Sanitary and Assistant Sanitary Inspectors was 1,425; as follows, namely, 2 public buildings, 725 tenement-houses, 96 private dwellings, 85 other dwellings, 4 manufactories and workshops, 8 stores and warehouses, 27 stables, 14 slaughter houses, 1 lime kiln, 2 manure dumps, 1 garbage dump, 1 fat-rendering establishment, 1 fertilizing works, 1 railroad tank, 5 sunken and vacant lots, 1 smoke-house, 1 street dump, 45 yards, courts, and areas, 53 cellars and basements, 70 waste-pipes and drains, 177 privies and water-closets, 31 street gutters and sidewalks, 5 dangerous stairways, 4 smoky chimneys, 1 cesspool, 7 other nuisances, together with 68 visits of the Sanitary Inspectors to cases of contagious disease. The number of reports thereon received from the inspectors was 669. During the week 48 complaints were received from citizens, and referred to the Sanitary and Assistant Sanitary Inspectors for investigation and report. Permits were issued to the consignees of 42 vessels to discharge cargoes on vouchers from the Health Officer of the Port; 56 permits were granted scavengers to empty, clean, and disinfect privy vaults. The Disinfecting Corps have visited 74 premises where contagious diseases were found, and have disinfected and fumigated 67 houses, 67 privy sinks, together with clothing, bedding, etc.

Fire-Proof Building. — The large store now building on the corner of Broadway and Grand St., New York, to replace the building burnt last spring, is to have no fire-proof construction. It is understood that the owners contend that they can get no rebate in insurance on the building, nor the lessee on insurance on stock, owing to the competition in insurance circles. This question must sooner or later be settled, as pure logic must convince every one that a fire-proof building does not stand the same risk of fire as one with no safeguards, and if, as insurance people claim, they can afford to make no reduction, it merely shows that they are taking too much risk for too little money, and owners will do well to think on the question of how soon insurance will be on a solid basis So soon as it is, a marked difference will be made in the rates on fire-proof buildings and fire-traps.

Verdict against a Contractor. — While the building of the American Express Company, extending from No. 51 to No. 61 Hudson Street, New York, was being constructed in April, 1878, John Crane was killed by a shutter falling upon him from an upper story. His wife sued the company and William E. Hanna, the contractor for the construction of the building, in the Superior Court, for $5,000 damages. The case was tried before Judge Freedman. The express company claimed that it was not liable, as the work was under the charge of the contractor. The contractor pleaded that the contract had been finished at the time, and he was then engaged as the servant of the company upon extra work. Judge Freedman dismissed the case as to the express company, and the jury gave a verdict against Mr. Hanna for $3,000.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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A FLORENCE letter in the New York *Times*, from Mr. James Jackson Jarves, records the progress and character of the new façade that the Florentines are adding to their famous Duomo. The front, as our readers remember, is a bare brick wall, which replaces the façade begun from Giotto's designs, and torn down at the end of the fifteenth century, to make way for a Renaissance front that never was built, but has been simulated from time to time by painted façades on canvas and stucco. The new front is intended to accord with the work on the flanks of the cathedral, being a facing of marble upon brick walls, enriched with inlay. The architect Defabris was selected at the end of, one might perhaps say in spite of, a competition in which architects from many quarters took part, and in which his design did not cover itself with honor, being — at least in comparison with the work with which it was to be associated — bald, mechanical, and to most critics very unsatisfactory. So unsatisfactory was it, indeed, that the work remained at a stand-still for a number of years after Victor Emmanuel had laid the corner-stone, because an acceptable design was not forthcoming from the architect. The competition, however, was fifteen or sixteen years ago; and Mr. Defabris has meanwhile had opportunity to improve his scheme, especially since he has had the anomalous privilege of studying the designs of his competitors, which have remained in his keeping.

THE renewal was fairly begun in 1875, and the skeleton of rough masonry on which the marbles were to be laid was finished in two years. Since then the casing has gone on: if we may judge from Mr. Jarves's statement wheel tracery has been put into the window at the clersetory level, it must have been carried over the whole front, and about a third of the decorative work is in place; and lately the scaffolding has been pulled down, to take breath, as it were, — to give a view of what has been done, and perhaps to wait for more money. The cost of it thus far has been about sixty thousand dollars, and it will take as much more to finish it, — a considerable burden to Florence, which has languished since the transfer of the capital to Rome. According to Mr. Jarves, so much of the work as is now displayed is "very satisfactory and extremely beautiful," — "a picturesque, brilliant, delicately sculptured front." We may hope that this praise is fully justified. The architect may have well profited by deliberate study and by the example of his rivals; both he and his workmen may have found ample schooling for richness and refinement of detail in their abundant renewal of the old work on the side façades; but the recollection of the bald *mesquinerie* of the new front of Santa Croce will breed a little anxiety in the architect who has not yet seen the work on the Duomo. Mr. Jarves expresses a natural apprehension lest the Florentines should decide to abate the contrast between the brightness of the fresh marbles and the mellowness of the old by their favorite device of scouring the old with acid. A more promising expedient would be that which is mentioned by a correspondent of the London *Times*, who describes the restoration of St. Mark's, of treating the new marble with sulphate of iron; but it is no doubt pleasanter to experiment with chemical reagents on the work of one's predecessors than on one's own.

IT is sometimes said — and the remark was repeated by Mr. Atkinson, a few days ago, in the discussion on his address concerning the Relation between Architects and Underwriters — that there is no such thing as fire-proof building. This is to be accepted or disputed, according to the meaning given to the word fire-proof. It is therefore a statement to be made with caution, since it depends on a question of terms. So far as it is literally true, it is of no great significance; as it is likely to be understood by the unthinking, if freely used, it is liable to check endeavor for improvement in a community which is only too ready to shirk the labor and cost of doing things in the best way. If we mean by a fire-proof building one that cannot be injured by any amount of fire, there is certainly no such thing. If we mean a building that is absolutely safe from injury by any conflagration of its neighbors, or of any material that can be burned in it, there is no such thing. These are truisms; but if we mean, what people commonly do mean, a building that does not contain in itself enough of combustible material to do it serious injury by burning, one that is not liable to be destroyed if the buildings about it burn, nor by the burning of such materials as are the usual contents of ordinary buildings, such buildings are common, and are the rule in cities which guard themselves carefully against fires. This degree of security is practicable, is worth attaining, and we attain it in special cases. We have not yet adopted in this country the most thorough-going means of protection against fire, yet during the great fire in Portland in 1866 the post-office in that city stood like an island in the middle of the fierce conflagration. Everything about it was burned; the stone-work of the outside was cracked and scarred, but the contents were uninjured, its interior untouched except at points where the warping of the iron shutters let the flames into it, and it was only taken down because the authorities preferred to do that rather than to recase it in granite. In the great fire of 1872 the Boston post-office served as a fire-dam, and was scarcely injured. If our buildings were as a rule built as securely as these, they would be proof against any fires to which they are likely to be exposed, except in case of buildings put to extraordinarily dangerous uses; and large fires would be almost unknown among them. In some foreign cities, notably in Paris, this is really the case. In Paris a few companies of enlisted men with small hand engines or pumps that would look absurd to our firemen are enough for the fires of the city, and have little to do. American travellers speak with astonishment of seeing the inhabitants look calmly out of their upper windows to watch the *pompiers* putting out a fire in the lower stories. When these things are accomplished we can safely say, in the sense in which the term is commonly understood, that there is fire-proof building. There is some time to wait before we can make such building obligatory, or even usual, in our cities, and in the mean time we shall do well to encourage as much as possible methods of slow-burning construction. But it is best, after all, to keep it in mind that the slow-burning methods are stepping-stones in the way to still better things.

THERE are those who would take this matter of building for protection against fire out of the hands of the law, and trust for amendment to private judgment or enterprise and the influence of underwriters. Our correspondent E. A. has intimated his distrust of the efficacy of building laws; another correspondent in an article which we print to-day argues for a union of insurance companies, and a system of inspection and discriminating premiums to be maintained by them, which shall influence owners to build securely. While we have argued for the importance of an active influence to this end on the part of underwriters, while we think that such an influence is most important in the absence or imperfection of building laws which is common, and a valuable ally to them when they exist, there are several reasons why it is not a sufficient reliance. In the first place, it is desirable that any rules upon which depend the security, not of individuals, but of a whole city, should be of universal application and supported by an authority that reaches everybody. There is no such authority except the law. There will always be persons who will prefer to run risks rather than pay for insurance; there will be others who will prefer an indulgent company to a strict one, and there will be indulgent companies for their encouragement. These cases will be always a source of danger to the community. The insurance companies' influence cannot protect one man from being endangered by his neighbors who are not

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insured and whom they cannot control. It is necessary, nevertheless, to protect men from their neighbors, and this is exclusively the function of the law. The influence of insurers, moreover, must be by nature intermittent. In proportion as it was successful it would lose its power, for as building grew safer from better construction the inducement to insurance would grow less and the habit would decline. It may be said that the need for a restraining influence would diminish with the danger; but security would bring recklessness on both sides. There would be a constant tendency of builders to relapse into bad building if they were not checked by law, and a parallel tendency of insurers to loosen their restrictions; for, except when the insurers and the insured are the same, a certain amount of risk is necessary to the business of the companies. They are not to be expected to permanently undermine a prosperity which is tempting enough to excite a keen competition. The ideal of the companies may rather be expected to lie in a nice balance between security and apprehension, with fires frequent enough to make owners eager to insure, and premiums large enough to make insurance profitable.

Any efficient control on the part of underwriters would of course mean a system of discriminating risks and graduated premiums, and this would imply some such system of examinations as our correspondent argues for. That insurance examinations should be more searching than they are, and companies more discriminating, is certainly much to be desired; but it would not be well to put any absolute reliance on them. To make a thorough-going examination of buildings finished and in use is next to impossible. It could be approximated to in a mill or a warehouse, but in most buildings it would be apt to cost more than the premiums for insurance. On the other hand, to keep a record of the construction of all buildings that go up is a thing that building inspectors may do, and are expected to do when they are city officers; but we doubt if any insurance association of underwriters could be expected to do it, or indeed could afford to on the chance of the houses being ultimately insured. Even when buildings are insured while they are going up, there is no disposition on the part of underwriters to examine them carefully, since the risk to which they are exposed by the work that is done in them is greater than that due to their construction. There is no doubt that insurers might do much good by such a classification of buildings as they might base on an examination of plans and specifications, and on a careful scrutiny of the buildings themselves by a keen, trained eye, and by graduating their premiums according to it. For anything more than this that they may be willing to do we can give our hearty encouragement, and be thankful; but we cannot afford to relax our efforts for a steady improvement of building laws and the municipal inspection of buildings. The records of these inspections are exactly what the underwriter needs for his own security, and indeed there is no way in which he can better help the cause than by joining hands with the architect in the endeavor to raise the standard both of laws and of inspections.

Since we last took occasion to refer to the Inter-Oceanic Canal question, M. de Lesseps, having arrived in Panama and found there an enthusiastic reception, has made a formal beginning of work on the canal; though a serious beginning is probably still some months in the future, the final surveys of location being still to be made, as we understand it. Meanwhile, politics and journalism are pressing upon our people the importance of an American canal, and that the Nicaraguan, though not without an occasional demurrer. Dispatches sent to the State Department in October, by Mr. Dichman, our Minister to the United States of Colombia, which have been lately published, urged upon the Government strongly the importance of interference with M. de Lesseps's scheme, for political reasons, and the inconvenience to us of having what he calls "an Egyptian question" opened on the continent. At a late meeting of the American Society of Civil Engineers, Mr. Julius W. Adams, ex-president, read a paper, wherein he brought forward the merits of the Tehuantepec route, which he held to be on account of its nearness to the United States the best for us, and for its ease of construction and maintenance the most feasible of all. Mr. Evarts, for political reasons and for the commercial development of the West, is said to favor this line. Admiral Ammen, on the other hand, has published a manifesto, in which he altogether scouts the Tehuantepec project, saying that "the only two routes worth looking at are Panama and Nicaragua, and they [the first, rather, we take him to mean] only to establish the relative approximate cost of execution."

It is said that articles of incorporation have been prepared by him and other interested persons, at the head of whom is General Grant, and are ready to be laid before Congress. As reported, they engage the Government to a very close and fatherly protection of the enterprise, even to requiring the Treasury to assure the care of the deposits of the company, and the army to furnish inspectors of the work. In the February number of the *North American Review*, Admiral Ammen publishes a paper in answer to that by M. de Lesseps in the previous number. It has an air rather of personal controversy than of judicial argument. It insists upon the difficulty of providing for the excessive rain-fall of the Isthmus, which seems to be the greatest natural obstacle in the way of the Panama Canal, but adds nothing of value to the discussion of routes. It is unfortunate that the canal question, so far as the United States are concerned, seems in the way of being settled by politicians and newspapers; neither of the two classes whose interest in it is most immediate and their judgment most to be trusted, the commercial capitalists and the engineers, having as yet any special part in the projects that are before the country. One conspicuous naval officer and a prominent engineer attached to the army are the only specialists who appear in the movement to which a host of inexpert and, we must believe, mostly ill-informed people are urging Congress to commit itself. What is the opinion of the capitalists whose interests are to be most directly affected by the result, — and who will be expected to furnish the money for the work, except so far as it can be educed from the Government Treasury, — we cannot judge. Probably their judgment is not formed as yet, and if they were left to form it in their own way it would probably be greatly influenced by the prevailing opinion of American engineers. We do not see that the persons and newspapers that are pressing the canal scheme concern themselves much about this prevailing opinion. If they did, they would find, we think, that it did not favor the Nicaraguan scheme, whatever it might say to the rival routes.

We notice that the United States Senate has passed the bill to provide a site for a new Naval Observatory; also that the joint committee on the Congressional Library has reported a bill for the appointment of a special joint committee to provide more room for the library. This time the proposal, as it has been so many times before, is to adapt the Capitol, that is, to enlarge it. The bill instructs the committee to employ three experts who shall consider what changes can be made in the Capitol for the better accommodation of Congress and its library, and to report a scheme with an estimate of cost. A bill has been introduced into the House, by Mr. Urner of Maryland, for building a monument to Key, the author of the Star Spangled Banner, a project which we should suppose that Baltimore, known as she is for the Monumental City, could becomingly and easily carry out without help from the General Government. We note with encouragement that the Mayor of Chicago has vetoed the ordinance we mentioned last week, which allows wooden buildings sixteen feet high to be put up about the city. It is less encouraging that he favors an ordinance which should permit the building of frame houses on the borders of the fire-limits.

The *Architect*, to which we owe many favors of the involuntary kind that clever journals offer to the scissors of their fellows, adds the more direct favor of a long notice of one of our numbers — taken at random, we should say. It proffers us a New Year's salute with a courteous profession of respect, for which we are grateful. We are not quite sure how much justification for its esteem its readers will find in the detailed comment; but will hope that they may draw a distinction between the respect we would fain justify by our general record, and its estimate of the particular number that it has chosen for notice. We return its salutation with equal respect, and a cordial acknowledgment of indebtedness. Since we are fortunate enough to have had files of the *Architect* from the beginning of our career, we will not assume to meet it as a new acquaintance. When we find an occasion to give our own readers our appreciation of its character, we shall rest more confidently on the abiding excellence of its quality and conduct than on the chance reading of a single issue.

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SOME CAUSES OF FAILURE IN AMERICAN ARCHITECTURAL DESIGNS.[1] II.

ANOTHER reason why many architects fail lies in the fact that they do not realize the dignity and importance of architecture. If any one art can claim the first place among the results of human genius, I think the strongest claim to that place rests with architecture, the art "which presses the noblest of other arts into its service and bends them to its will, at once their beginning and their end, the most lowly in its origin, the most glorious in its perfection." But while any discussion as to the relative dignity and position of the arts must be held as unwise and unprofitable, this is no reason why an architect should not be fully impressed with the dignity of architecture and of the responsibility which its practice lays upon him.

From the dim days of Egypt down to the present day no other art has been so clear an exponent of a nation's intelligence and culture as architecture; so much so that one might almost read the history of the human race in what remains of its buildings, and voiceless as these ruins may at first seem, they are full of utterance, for or against the people under whose hands they were first raised. Are we to be judged by any such standard in the future? Who can look at the calm grandeur of Karnac, or stand at the foot of those stately towers of Notre Dame, or thrill before the solemn splendors of Canterbury or York, and fail to feel that in espousing the cause of architecture, in becoming its votary and exponent, he has taken an enormous responsibility if he would do work at all attuned to the key-note which has been struck in these almost eternal symphonies of stone? He need not feel discouraged: quite the contrary; but he should labor so to learn the principles which guided the builders of these works that no matter how small the work he has to do he may do it in their spirit and with their wisdom.

And this leads me to a third cause of failure, which springs both from lack of education and from a want of appreciation of the dignity of architecture. It is that very many architects practise the art, more often than not, not as an art but as a trade. Pitiable as this may be, it is in no way surprising. What other result could follow? Ignorant of its principles, the knowledge of which might unlock some of its mysteries to them, might draw the veil and let them see with what almost God-like business they were concerned, ignorant of it and blind to its character and responsibilities, they rush in where angels might fear to tread. They drag down to their own level an art whose proper business it is to glorify and beautify our lives, and they make it the ignoble means to an end. Ignoble, I say, for any means must be ignoble which deals with prostitution. Have they not adopted the art, should they not strive, therefore, to protect and prosper her? and yet ignobly they prostitute her. Do not think that I wish in any way to ignore the necessity of toiling for one's daily bread, for bread is as necessary to an architect, certainly, as to any one else, but this, it seems to me, has nothing to do with practising architecture in such a way as to render the architect unworthy of his art. How many men work with pride, with love for the art, or for the art's sake? I venture to say not one in twenty. It is impossible, looking at what we must see in walking the streets of the cities of America, to believe that the men who designed the buildings about us love the art which made these buildings possible. I do not ask any to give up their five per cent, or any part of it; rather would I urge them to insist on more; but can they not practise architecture for something more, for something higher, than this five per cent? Yes! For the love of the art! They cannot love it if they do not know how worthy it is of their highest love and devotion, and they cannot know this unless they know how great things it has done, and what noble principles lie at its heart. If they know it, and if they love it, — and so alone — can they so practise it that the reproach which to-day must be laid at their doors can be withdrawn? Then, and then only, can the architects say, We have given you the best that our brains informed could imagine, our judgment exercised could correct, and our hands trained could fashion, but you, blind Public, you will not see our good work, and you refuse us your sympathy and your encouragement!

That they will some day be able to say so if they will it, I do not doubt, but only in so far as regards their share, for then the public will not be blind, it will see their good work and it will not refuse them its encouragement and its support.

A few words will suffice to set before you those causes of failure which lie beyond the direct control of the architect, and which, though now active in their influence against the successful accomplishment of any architectural problem, will in time, let us hope, be less powerful in their influence.

In any country or in any age, where no fixed principles are held as the foundation for architectural practice, where no limit is imposed upon individual taste or personal bias, a wide range must naturally result. This country, receiving, as it does, accretions to its population from every variety of foreign source, bringing within its borders men from the remotest parts of Europe and Asia, with their tastes and habits of life and thoughts distinctly developed, must, for the present, be the scene of great license in the character of any works of architecture which it may produce. We see the strongly marked influence of English, German, French, and Italian taste in any works built either by or for persons whose sympathies lead them back to styles prevailing in their fatherlands. The intelligent German desires the forms and characteristics of German architecture reproduced in the design of any work in which he is interested and likewise the Englishman and the Frenchman, and so much so is this the case that from the architecture of certain cities or towns one can judge readily from what part of Europe the majority of their citizens has come.

We have no distinctly American architecture, but rather a free admixture of all sorts and kinds, drawing its inspiration from many fountains. This state of architectural practice is in no way calculated to produce a national architecture, nor to lead the practice of the architects towards or into any one style. Whether or not in time the habits of American life, the character of the people, and the necessities of climate and other natural causes will fuse all these varieties of style into one homogeneous form, answering to the requirements of our civilization, harmonizing with the eminently practical spirit of the people, and meeting the exigencies of our climate, must be left for time to decide, but to-day no such individual style exists. Our streets might be the streets of the modern part of any European town, so far as any distinctive architectural character is to be found in them.

That this has its influence in the creation of any architectural work cannot be denied, for had we a style in which those elements were strongly marked, and in which the majority of our architects practised, the very return of things would result in a far greater number of successful designs; but we are too young a people to have created a style of our own and to have developed and perfected a form which should be the type of all American buildings. In this we are at no greater disadvantage than all nations who have in past times erected a style peculiar to themselves, and so far as we can judge many circumstances connected with our national life are in favor of a successful solution of the problem — the nature of the government, the general intelligence and education of the masses, and the wide distribution of wealth, all of which are influences, having been powerful factors in the creation and development of more than one of the great family of styles.

The newness of architecture in America, then, is one of those causes which are by no means to be overlooked in defining the causes of failures in the architectural designs of the present time. And directly contingent upon this is another cause which must be included among those influences adverse to the production of successful designs, and this is the absence in this country of any great monuments of architecture, which, while they may be taken as models for the formation of the architect's taste, at the same time act as a stimulus and incentive to his efforts. An architect producing a design as good as, or even better than, the average of those produced around him will naturally rest satisfied with his work. He has done as well as any one about him, although he may have been capable of doing much better, but of this he is either ignorant or indifferent. His powers have not been taxed to the utmost, and so long as he has to measure himself with men less able or no more able than he is, they never will be. Had he around him such monuments as English, French, or German architects must meet at almost every turn, he would have a stimulating power at work quite independent of any current competition; an incentive as powerful as it would be beneficial. No matter how good his work might be, we should be very sure that it fell short of the point of excellence reached in those structures of more distinctively artistic periods.

While this disadvantage is inseparable from the newness of architecture in this country, it will depend very much upon us of this generation and day whether we advance or retard the time when the architects may have some good models around them. We cannot hope to erect cathedrals in all our towns, nor to scatter abroad through the land such works as the architects of the Middle Ages left to posterity, but we can, even in the smallest and least important works which we may have to do, leave results embodying principles of right, results which, so far as they go, are instructive and creditable, calculated like seed sown to grow in time into something higher and better. If on the other hand we work in a slipshod, indifferent, ignorant way, just so much longer will be deferred that era of intelligent work which we should all wish to advance, and just so much more difficult will it be for those more intelligent and conscientious architects who may follow us to undo the harm which we have done. All our indifferent works, all the ignorance and carelessness with which we stamp the architecture of the present, will receive, perhaps, some admiration, and find imitators, and so its evil influences will spread farther and farther; but if we learn some true, fixed principles of the science and beauty of architecture, and embody them in our works, we will commence at least the accumulation of some works worthy of study and of imitation.

It is a law quite as true of art works as of anything else produced, that the supply equals the demand; that is, if good architecture is wanted by the public, it can have it. Here again is another reason why we do no better things; they are not wanted, much less insisted upon. We have an ignorant public to deal with, which is without any general art culture, and which even, when somewhat familiar with the principles governing the representative arts, is for the most part ignorant of and indifferent to that art whose connection with its life is most absolute. We deal with a public which too often likes what it should despise, and which sees no difference between a building with a soul and one without. There can be but one effect

[1] A paper by Mr. W. A. Potter, F. A. I. A., read at the late convention of the American Institute of Architects, held in New York in October last. (See page 27, *ante*.)

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produced upon a thoughtful, studious architect left without encouragement and support while some charlatan or mountebank builds up his impertinences to be admired and quoted. Is it a wonder that when he is employed he works with indifference, and without joy or enthusiasm? He sees with what worthless results the public is content, and that stimulus which ought to be added to his love of his work being wanting, his indifference and finally his despair creep out and show themselves in every line he may draw and in every effect he may create. If we could look to the public for discrimination, for appreciation, for censure, for rebuke, how much better our designs would be one can hardly realize; but the indifference which passes by our best efforts, and the ignorance which applauds our failures, cramp us, and leave us without the best promoting and correcting influence which could possibly be exerted through us upon our art.

If then, we are and must remain without that correcting influence which intelligent public criticism would furnish, the responsibility is all the greater with us to be our own intelligent, thoughtful, honest critics, our own judges, impartial, severe, fearless. It is essential to the development of any art, that its work should be tried in the crucible of honest, intelligent criticism. If the architects as well as the public are ignorant, they may as well lay aside any hope for better things in the near or in the remote future, for they will not get them.

But if they inform themselves of the principles which are the groundwork of the past, if they study to acquire the spirit which has produced the greatest results of the art, if they reach a fair appreciation of its beauty and dignity, if they become possessed of some convictions as to what is right and what is wrong, then the profession may do without that public criticism for which it now looks in vain, and in some measure fill its place. At least we will not then be the blind leading the blind.

Along the devious, dim path through which we must lead the public to the point of intelligent appreciation, grateful approval, and honest reproof, let us see that our lanterns burn brightly with the light of the true principles of architecture; that no ignorance and conceit of ours dim and retard the radiance.

Small though these points of light may at first be, their accumulated power may at some time reach a splendor of effulgence which shall spread out in all directions, and become a very beacon light, burning with all the brilliancy and purity of those two great lights, Greek and Gothic, and, like them, may mark one of the splendid periods of the building art.

GOTTFRIED SEMPER. I.

Born at Altona, November 29, 1803.
Died at Rome, May 15, 1879.

The past year has deprived us of two of the greatest architects of modern times, — Viollet-le-Duc and Semper. It is a phenomenon worthy of note as a characteristic of the groping and unsettled state of present architectural civilization, that minds so different, advancing in directions so diverging, could attain in the same age to so high an eminence and to so great influence. Viollet-le-Duc is too well known with us to here need a tribute to his memory, but it seems otherwise with Semper, who was, as I think, far more suggestive and powerful than his better regulated French contemporary. A comparison between the two men would offer little else than contrasts. A parallel of their buildings is one-sided. While the theatres and museums of Semper must take a high position in the architectural work of the nineteenth century, the conscientious restorations and unfortunate designs of Viollet-le-Duc have already less architectural importance than psychological interest when compared with his literary labors and drawings. Viollet-le-Duc's writings are, on the other hand, widely popular, voluminous, and well-arranged, while those of Semper, if more valuable, are abstruse, few in number, and scattered in the proceedings of societies and the catalogues of Italy, Switzerland, Germany, and England. Those of the former are translated into various languages and lie upon the shelves of every bookseller; those of the latter are, with few exceptions, out of print, and attainable only in large libraries. This want of popularity, though it does not greatly detract from Semper's real worth, may account for the comparative ignorance of his life and works which prevails among his profession.

Gottfried Semper's was by nature one of the most gifted minds that have made architecture their study. He possessed characteristics which would have made him prominent in any age or in any calling. As a boy he was noted for a firmness of will amounting almost to obstinacy, for a strength of constitution which in later years enabled him to withstand the shocks to which an adventurous life in every part of Europe exposed him, and which assured the counterbalance of logical and penetrating common-sense to his impulsive and ideal imagination. The sight of the siege of Hamburg and the entrance of the victorious allies is said to have moved him to choose the vocation of a military engineer, which afterwards led to architecture, — somewhat in opposition to the plan of his father, a well-to-do merchant, who, desiring that his son should become a lawyer, insisted on his completing classical studies which in later years served in good stead for his architectural investigations.

A historical and classical education is of the utmost importance to the designing artist, who needs, in general, cultivation, just that which our high and technical schools do not teach. It was one of the wisest laws introduced by that great promoter of the arts, Louis the First of Bavaria, that an architect, to be admitted to governmental practice, must have passed the so-called gymnasial or humanistic examination of the German classical schools.

Semper's student life in Göttingen was wild; but it is evident that he was deeply influenced by Karl Otfried Muller, at that time professor there, an archæologist whose monument upon the sacred hill of Colonos is so well deserved a tribute to his self-sacrificing zeal in Greek research. Müller's comprehensive knowledge was blended with an enthusiasm and living interest which naturally made itself felt upon so plastic and receptive a mind as that of Semper, who left the university with the broad foundation of intellectual gain and appreciation upon which his subsequent investigations have been erected. His first professional work was in the growing Munich, with Gärtner, an advocate of a species of Byzantine-Romanic style, the author of many of the dreary structures which make the long streets of the Bavarian capital so wearisome. The jumble of architectural styles then practised there left no impression upon Semper, whose studies were wisely confined to a mastery of the necessary practical bearings of the profession. He soon received a commission to prepare measurements and drawings of the Cathedral of Ratisbon for Bülan's work. But the Gothic was foreign to his clear mind; he could find in that style no possible solution of the problems offered by the civilization of to-day. It may be regarded as fortunate for Semper's further artistic development that, after a short stay in Ratisbon, he so seriously wounded an adversary in a duel that he was obliged to fly the country. He took refuge in Paris at a time when French art was at its greatest brilliancy, — when the École des Beaux-Arts and the Palais d'Orsay were building, when the contention between the classic and romantic schools had enlisted so many great names on either side. This restless activity reached its climax in the revolution of July, 1830, — an event greeted with enthusiasm by Semper, who was always an impetuous republican.

Politically disappointed by the results of those disturbed years, he recommenced his wanderings, going from the Italian cities, whose masterpieces of Renaissance architecture he so thoroughly studied and understood, to Sicily, and finally to Greece. Here, "an obscure workman in a linen jacket," he laid, by long study, the foundations of his professional mastery, and gathered many of the materials for his later writing, gaining an understanding and an insight into the art of building which is hardly otherwise to be obtained. The artist became for years an investigator; not, however, seeking mere facts or archæological curiosities, but methods of thought; not observing the admirable solutions of former problems merely in their peculiar manner of expression, but in their guiding principles. His companion in Greece was the talented Jules Goury, whose early death, while on an expedition to Syria with Owen Jones, has been so much lamented.

Semper confined himself in his Greek studies very much to a thorough investigation of ancient polychromatic architecture and the coloring upon buildings of the best periods. The results were astounding revelations to those who could only conceive the perfected forms of Greek architecture in the prudish pallor of white stone. Returned to his home, he published his first work, Preliminary Remarks upon the Painted Architecture and Sculpture of the Ancients, little more than a pamphlet in extent, but fresh and powerful — a welcome contrast to the torpid professional literature of that time. A vigorous attack upon empirical and unreasoning formalism, it made upon Semper's former friend and teacher in Paris, the talented and cultivated Gau, "the effect of one of Beethoven's overtures." It is to be regretted that the projected work upon the subject of polychromy, a publication of various drawings of Etruscan, Greek, and Roman painted architecture, among which a colored restoration of the Athenian Acropolis was prominent, never appeared.

Meanwhile Semper received, by the good offices of Schinkel, an appointment to a professorship in Dresden. The fourteen years in that city were the prime of his life; his work during that period has, for extent and quality, seldom been surpassed. A new dawn of the architectural art of Saxony, and even of Germany, may be said to date from his advent. Chief among the buildings which he designed are the great barracks of Bautzen, the synagogue of Dresden, — an experiment of architectural characterization, — the well-known Villa Rosa, the Oppenheim palace, and above all the celebrated theatre and the museum.

The part of the city where the theatre now stands was formerly an unclean crowd of irregular houses, — the so-called "Italian village," put up for the hosts of Italian stone-cutters and stucco-workers who were employed during the last century upon the enormous buildings of this vicinity, the Catholic church, and the Zwinger. This quarter had become a notorious locality, a blot upon the trim and not altogether unpretentious city of Augustus the Strong, which was to be swept away at one stroke. In its place Semper projected a collection of mighty buildings, — the new museum, the orangery, the theatre, connecting porticoes and broad terraced steps rising from the level of the Elbe. This grand forum was to be closed by the three sides of the Zwinger already in existence. But, in the same manner as the gigantic palace projected by Poppelmann had itself left but that court as a fragment of the intended complex, did Semper's plan suffer dismemberment until the theatre stood alone upon an open expanse, unassisted by any of the structures which were to have surrounded it. But the architect so well fitted the

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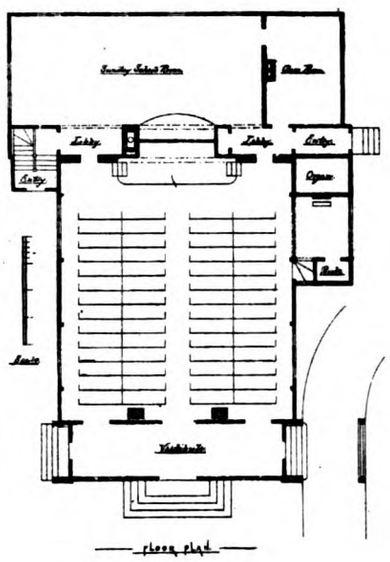

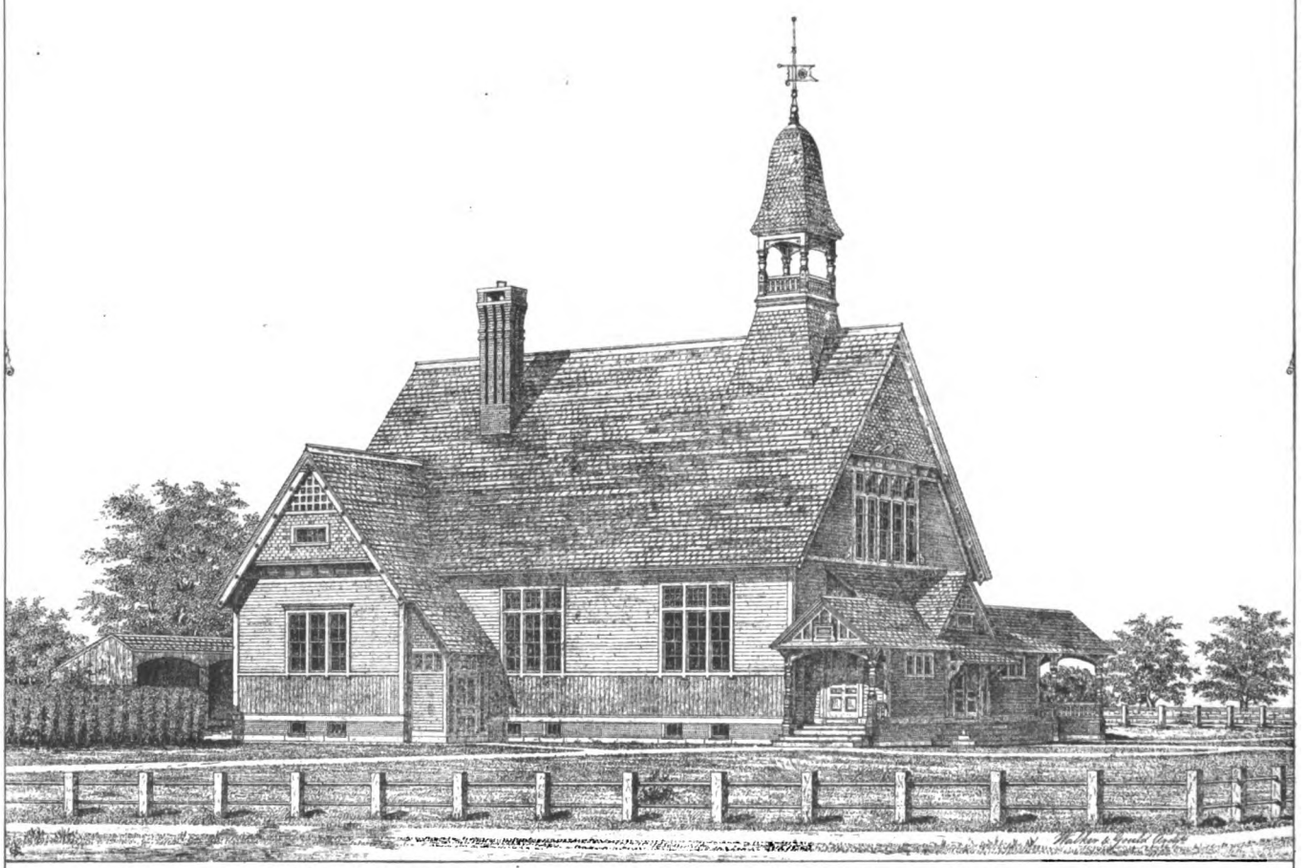

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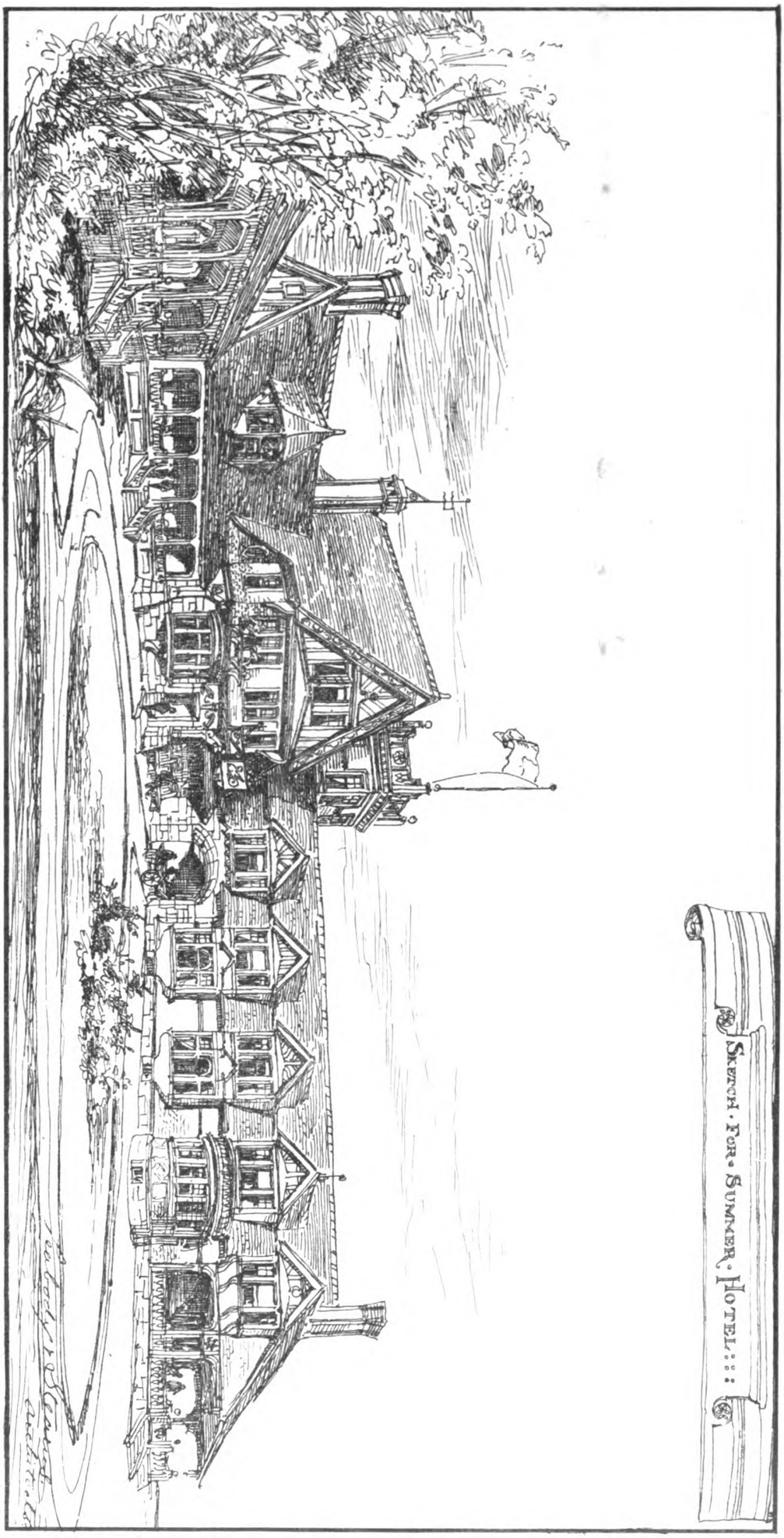

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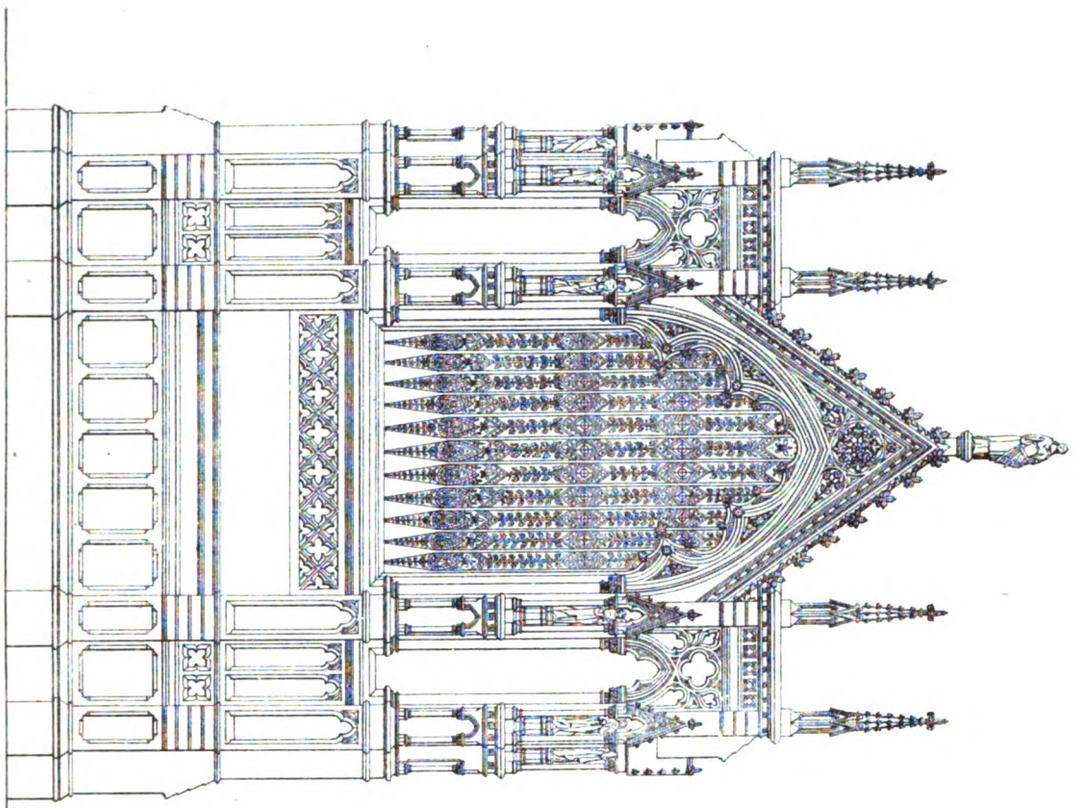

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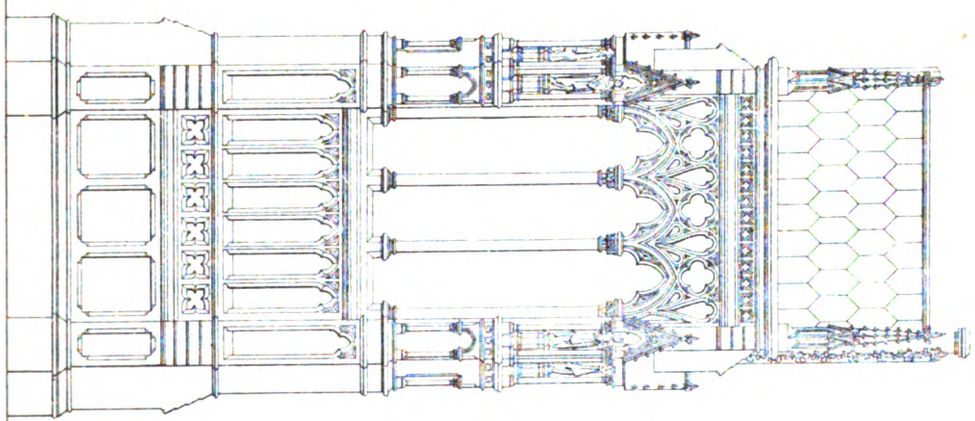

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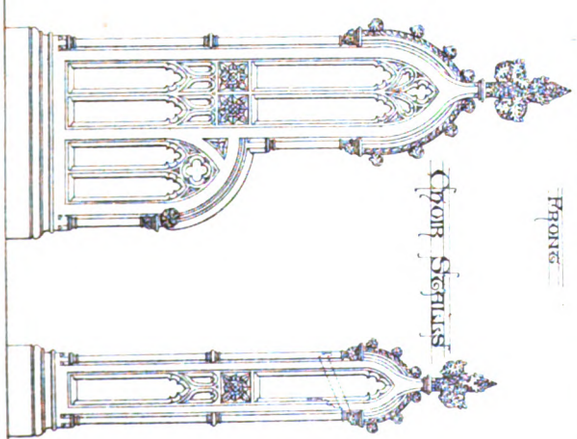

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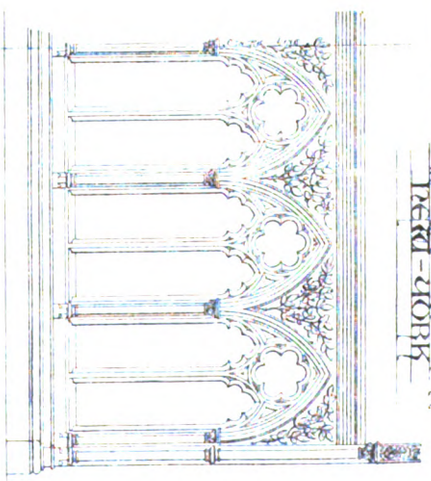

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building into the great void, so well harmonized it and the subsequently erected museum with the surrounding structures, that this dismemberment is hardly to be deplored, though the intervening spaces are perhaps a little broad and bare. The imposing semicircle of the auditory expressed upon the exterior, the open arched arcades, the closed attic rising behind the crowning balustrade, the unity of the entire composition, as well as the perfection of every detail, made the theatre one of the most beautiful buildings of modern times. It is published in folio with copper-plates: Das königliche Hoftheater zu Dresden, Braunschweig, 1849. The writer remembers well the intense feeling of public and even of personal loss felt by those who stood before the fire which entirely destroyed the building ten years ago. The theatre cost Semper many hard battles, and had it not been for the almost demoniac force and impetuosity of the man, which frightened the triviality of the Dresden bureaucrats, the narrow formalism of this gentry would have rendered its erection impossible. Every piece of furniture, every ornamental member, each detail, was designed and drawn by Semper in full size. He worked upon the plans over six years. There was not one piece of ready-made work within the house. The influence of all this upon the arts and manufactures of Dresden may be imagined; still Semper was but one individual, and much sank to its former level of mediocrity after his departure. J. T. C.

THE ILLUSTRATIONS.

DESIGN FOR A SUMMER HOTEL. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

THIS hotel was intended to be in the centre of a group of cottages, some connected with it by a covered piazza and some detached. The project has been abandoned.

FIRST BAPTIST MEETING-HOUSE, PROVIDENCE, R. I. MESSRS. WALKER & GOULD, ARCHITECTS, PROVIDENCE, R. I.

HOUSES FOR J. GREENOUGH, ESQ., JAMAICA PLAIN, MASS. MR. W. R. EMERSON, ARCHITECT, BOSTON, MASS.

ORGAN-CASE FOR THE CHANTRY OF GRACE CHURCH, NEW YORK, N. Y. MR. JAMES RENWICK, ARCHITECT, NEW YORK, N. Y.

ROMANESQUE ARCHITECTURE.[1] II.

THE essence of good architecture of any kind is that its constructive system should be put boldly forward, that its decorative system should be such as in no way conceals or masks the construction, but makes the constructive features themselves ornamental. Both in Grecian and in Gothic architecture this rule is thoroughly and consistently carried out. In a Grecian building the entablature is the main feature of the construction, and it proclaims itself as such. In a Gothic building the pointed arch is the main feature of the construction, and it proclaims itself as such. In neither case is there any attempt at concealment or disguise of any kind. But how stands the case with classical Roman architecture? Here we have a style in which the main feature of the construction is not made the main feature of the decoration. Here we have a style in which the great constructive features seem as it were ashamed of themselves, where they try to hide themselves behind a mask borrowed from a different system of construction. The architecture of classical Rome is, like the literature of classical Rome, imitative. Italy, the land to which the world practically owes the great discovery of the arched construction, may very likely have had a native architecture, as well as a native literature, in the days of the Kings and the early Consuls. But the architecture of classical Rome was a mere imitation of that of Greece. It was indeed but an imperfect imitation. The Roman architects were not so besotted as to cast away their own great invention of the arch, and to fall back on the less flexible, less diversified, constructive system of the Greek entablature. But, just as they spread a varnish of Greek forms, Greek metres, and what not, over their native Italian literature, so, in like sort, they spread a varnish of Greek decoration over their native Italian construction. Buildings whose real construction was that of piers and arches were masked with a decorative imitation of the columns and entablature of a Greek portico. But as it was in other things, so it was also in architecture. The true Roman spirit was masked only, and not destroyed, by the fashion of Greek imitation. As that spirit shows itself in the satirists, the historians, and even here and there in the poets themselves, as it stands out more clearly still in the mighty fabric of the Roman Law, so there are classes of Roman building in which the national arched construction stands out, masked but feebly, or not at all, by the varnish of Greek decoration. In an aqueduct or an amphitheatre, Greek features, columns and their entablatures, are either absent altogether or are something so secondary as to have but little share in the general effect. In buildings of this kind, the round arch, the main constructive feature, does really stand out as the feature which gives the building its main architectural character. And, as Mr. Petit remarked long ago, the step from buildings of this kind to some of the plainer forms of the later Romanesque is very slight indeed. Some of the great German churches, such, for instance, as the three great Rhenish minsters of Mainz, Worms, and Speier, where the interior elevations consist of square piers supporting perfectly unadorned round arches, have surely a great deal in common with a Roman aqueduct. In both we see the round-arched construction standing boldly out in its most undisguised form. And buildings of this kind, whether aqueducts, amphitheatres, or churches, which rely almost wholly on their unadorned constructive elements, may undoubtedly be grand and striking in the highest degree. Still a style of architecture would be narrowly limited in its resources, if it were forever confined to such elements as these. The massive, unadorned, square pier was suited for many purposes; but there were also many purposes which asked for something more graceful, something which better offered itself for enrichment. There was one feature of the Greek constructive system which the Roman architect could do something more than blindly imitate. There was one feature which he could really adopt, for which he could find a place in his own system as appropriate as that which it had held in the system to which it belonged by birth. The Grecian column was freely employed by the Roman architects, but for a long time, in truth during the whole of the purely classical period, it was used only in a feeble, hesitating, and inconsistent way. Roman architects built porticoes and colonnades after purely Grecian models, without bringing in any feature of the national constructive system at all. Or columns and entablatures after the Grecian model were attached as a mere decorative mask to buildings really built according to the national mode of construction. At last, in days which we are taught to look upon as days of decline, in days which are looked upon as days of degradation both for literature and for art, the great step was taken which was to give Roman architecture a harmonious and consistent form, the step which was to make its chief decorative feature become also the chief feature of its construction. In the Greek system the column had boldly and honestly supported the entablature. In the Roman system of construction, the round arch answered to the entablature. What then was needed to make the column a real feature in the Roman system was to make it discharge in the Roman construction a duty strictly analogous to that which it had discharged in the Greek construction. In the Greek system the entablature had rested on the capitals of the columns; what was now needed was to make the round arch rest on the capitals of the columns also. The simple change at once gave Roman architecture a form both consistent in construction and graceful in decoration. Next to the introduction of the arch itself, no architectural revolution has been so great and so lasting in its results. The man who first boldly set his arch to rest on the capitals of his columns made a change which led the way to all future developments of arched architecture, round and pointed alike.

The first building, as far as we know, in which this great change was made was the Palace of Diocletian at Spálato. No time, no place, no author, could be more fitting for such a great architectural revolution. The change was not made in the local Rome, but on the other side of the Hadriatic, in a land which the Romans of an earlier time had looked on as a distant and barbarous province. But in those days the local Rome had ceased to be the only Rome. Rome was now wherever the Roman law and the Roman language had spread themselves, wherever men submitted to the rule of the Roman Cæsar. And no corner of the Empire was then more truly Roman than the Dalmatian land which sent forth that long succession of wise and valiant Emperors, Roman in every nobler sense of the word, though the local Rome was neither their birthplace nor their dwelling-place. And it was well that the greatest of them all, the founder of the Empire in its later form, should also be the man at whose bidding the first consistent Roman building rose. The keen eye of Diocletian had at last seen that the Roman Commonwealth was at an end; he grasped the fact that the Empire was a monarchy, and grasping the fact, he had not shrunk from putting it prominently forward before the eyes of men. The Illyrian peasant, in the days of his power, had been the first to deck himself with the outward pomp of royalty, when so to do was simply to give an outward expression to what for many generations had been the greatest of practical facts. The same man, in the days of his voluntary retirement, carried out a change in Roman art exactly analogous to the change which he had already carried out in the Roman polity. Alike in polity and in art, he swept away traditions which had become cumbrous and useless, and let things stand forth as they really were. Alike in recasting the constitution of his Empire and in designing the hall of his palace, Diocletian made the real construction of the fabric stand forth undisguisedly before the eyes of men. Alike in his political and in his architectural creation, he put the crown to the work towards which his predecessors had been feeling their way for three hundred years.

The palace of Spálato I have never seen with my own eyes, but the views of it given by Sir Gardner Wilkinson are quite enough to set its main features clearly before us. The new invention is not indeed consistently carried out throughout the whole building; that would have been too much to look for from any architect of any age or country. But it is applied to the long colonnades of the great hall, and noble ranges they are. A consistent round-arched building has at last been called into being, a building of a less massive and a more ornamental type than the aqueduct, or even than the amphitheatre. As the first consistent arched interior, the hall of Diocletian's palace contains in it the germs of all later architecture; the germs not only of Ravenna and Pisa, but of Caen and Durham; not only of Caen and Durham, but of Westminster and Amiens. As such, there is no more memorable building upon earth. But it is in no way wonderful that the great improvement which it offered was not at once universally accepted. Every architectural development has to go through a stage of transition, a stage when the new principle and the old are

[1] See page 28, *ante*.

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striving for the mastery, and when the two are mingled together in various degrees and proportions. The architect of Spálato showed that columns could be used as the immediate supports of arches; he did not at once persuade the whole world to use columns as the immediate supports of arches. Men had been so long used to look upon the entablature as the right thing to rest upon the capitals of the columns that they could not all at once bring themselves to let the arch come straight down upon the capital itself. It seemed as if something must be done, as if some change must be made, to adapt the capital to its new duties. Something must be thrust in between the capital and the arch; some fragment, as it were, of the entablature, must come between the abacus of the capital and the impost of the arch. Or perhaps the abacus itself must be enlarged into something like a piece of entablature, or the whole capital must be drawn out to an unusual size and height, in order to seem more worthy of its new prominence, and better able to bear the weight that was laid upon it. For it is manifest, and it is one of the great advantages of the arched construction, that the columns, or other supports of a range of arches, may be placed at much greater distances from each other than the columns of a colonnade supporting an entablature. It follows that each column and its capital assumes in the arched building a greater importance; it has, so to speak, a more distinct separate existence than belongs to the columns of a colonnade. In the later Roman architecture we therefore find all kinds of shifts to avoid that immediate juxtaposition of the arch with capitals of the hitherto accustomed forms, on which the architect of Spálato had already ventured. In the basilicas of Ravenna I do not think that there is a single case where the arch comes down immediately upon an Ionic or Corinthian capital. These wonderful works of Western Emperors, of Gothic Kings, and of Eastern Exarchs were reared out of the spoils of earlier buildings. Columns and capitals were brought from various quarters; their proportions did not always exactly tally with one another; a column did not always agree with the column which stood next to it, or with the capital which its own shafts supported. But, among all the shafts to which the architects of these churches were driven, in order to keep something like order among the columns which were thus strangely brought together, in every case, whatever may be the form of the capital, a member is thrust in between the capital itself and the arch. For such a member there is no real need, either constructive or decorative; it simply shows how men clave to the idea that the proper use of a column and its capital was to support something like the horizontal line of the entablature. The local use of Ravenna preferred the employment of capitals of the received classical shapes with this needless member interposed — a member which wants a name, and to which that of the *stilt* has sometimes been given.[1] At Constantinople on the other hand, — I speak here not from personal knowledge, but from the Chevalier Fossati's splendid drawings of Saint Sophia, — though the stilt is not unknown, yet the tendency seems rather to have been towards devising new forms of the capital itself. Some of them, with a different proportion, still keep something like the general idea of a classical capital, while others, especially the well-known Byzantine basket-capital, altogether depart from classical models. At Ravenna no difference can be discerned between the works of the Roman Placidia and those of the Gothic Theodoric. The wise barbarian who preserved for the conquered Romans their laws, their language, and their buildings, followed their models also in his own original works. But with the recovery of Italy under Justinian new forms came in. In the Church of Saint Vital, begun during the Gothic dominion but not finished till after the conquest by Belisarius, the new Byzantine forms of capital are seen. But the local custom did not wholly die out, and the stilt appears in Saint Vital also, often taking the form of what we must call a double capital, one being placed over the other. The Byzantine forms, in their later development, are found also among the vast stores of capitals, brought and copied from all possible quarters, which are to be seen in the portico and the galleries of Saint Mark's at Venice. But for true columnar arcades, like those of Ravenna, we must leap over several centuries, till we come to the works of the eleventh and twelfth centuries at Pisa, Lucca, Murano, and Torcello. Here, with the changes of detail which are natural after a space of eight hundred years, we come back to the same state of things which we saw at Spálato. The arch again rests immediately on the capital of the column, and the columns and their capitals are either classical remains used up again, or else they are as nearly imitated from classical models as the art of those ages would allow.

CORRESPONDENCE.

THE PANIC AT THE WEBSTER SCHOOL.

St. Louis, January 15, 1880.

The fire at the Webster Public School in this city on the twenty-sixth day of November last was in its consequences an important and fortunate occurrence, since it led to an investigation of the condition of our older school buildings, and to certain re-arrangements, especially of their heating apparatus, which have long been needed. In itself it was a very insignificant affair, quite undeserving the prominence it received the next morning in the telegraphic intelligence of the Associated Press. It was extinguished almost instantly without help from the fire department, although it was summoned and was quickly on the spot; the entire damage to the building by fire probably did not exceed ten dollars, and beyond sprains and bruises there was no physical injury suffered by its inmates: still it was undoubtedly a narrow escape, one which could not safely be looked for again under the circumstances, and the fact that providentially rather than through human precaution the lesson was a mild one should not make its admonitions any the less impressive.

What is known as the Webster School embraces two large buildings occupying the centre of a circular plat of ground about three hundred feet in diameter, which provides ample play-room for the scholars; a wide paved street encircles it, thus securing privacy and isolation for the school. The "Old Webster" is of brick, three stories high above the basement, and has four rooms on a floor, twelve rooms in all, each for sixty-four pupils. It was built in 1852. The "New Webster," built some fourteen years later, is likewise of brick, three stories high, and of about the same size as the "Old Webster," which it faces, but at a distance of fifty feet or more. Each school is heated by a furnace in its cellar. The fire was entirely in the old building. It caught from the furnace: this had long been suspected to be in a dangerous condition and to have been the cause of slight fires on several former occasions. Some of the teachers had made complaints, but as they were not supposed to understand the difficulties and mysteries of practical calories, their remonstrances had slight effect.

The heating arrangements of this and others of our older school buildings show that the operation of hot-air furnaces was very imperfectly understood thirty years ago. Possibly the same remark would apply to the present state of our knowledge on this subject, but in some things we have certainly made an advance. For example, it is no longer thought safe to place tall furnaces in low basements, where heated iron will be close to or in actual contact with the unprotected wood of the joists and floors above; nor to conduct hot-air pipes at random through pine floors and stud partitions in the delusion that a tin pipe cannot be made hot enough by warm air to ignite or injure wood; nor to encase such pipes in loose sawdust used for deafening. All these errors of a former day are exemplified in the Old Webster! The janitor reports that the dried and charred sawdust which had surrounded the hot-air pipe where the fire started fell to the floor in heaps as the ceiling was torn away.

The fire was discovered in the morning, soon after the school had opened. There must have been not far from fifteen hundred pupils in the two buildings at the time. A quiet notice to dismiss was sent to all the teachers in the old building, and it is probable that all the children would have been sent home safely, hardly suspecting the reason for their early discharge, had not some unauthorized person grasped the rope and rung a frantic alarm on the large school bell outside. This precipitated the panic. Some of the children in the upper rooms, seized with terror, rose from their seats, rushed past the teachers (chiefly young ladies), who sought to detain them, and began to run through the halls and down the stairs, crying, shouting, and screaming at the top of their voices. The panic spread at once through the building. The inmates of other rooms, over-powering or escaping from their teachers, rushed into the halls and to the stairs, which were quickly blocked, and all the familiar incidents of panic among adults were here repeated by the children. Some tried to jump from the windows, others slid down the convenient bell-rope, others joined the struggling crowd in the halls, treading to the floor the weaker ones in front of them. A stair-railing was broken down by the lateral pressure, and the children leaning on it were pushed headlong to the floor below. Fortunately the fall was but a few feet and no bones were broken. A brave lady teacher who placed herself at the foot of a stair, and tried to hold back the throng which crowded it, was quickly thrown down by them and trampled under foot.

The contagion spread to the new building, and for a time the same scenes were threatened there, although there was no fire or trace of fire. By great exertions, however, the children in the new building were confined to their rooms. The precaution had been taken long ago to have the entrance doors to the St. Louis schools open outward, and as it was finally apparent to the children that there was no fire to fear and a free exit for all, their panic subsided and they were all gotten out of the building, to the infinite relief and joy of their agonized parents, who crowded around the school from far and near.

For several days these schools were closed. Meanwhile the furnaces in both buildings were lowered and the heating arrangements thoroughly remodelled. The bell-rope was also remembered and cased in a manner to prevent its being reached by any unauthorized person. More than this, the School Board, reminded of the complaints of teachers from other schools about their furnaces, expressly instructed their building committee to make thorough and minute inspection of the heating apparatus of all the city schools, with a view to the prompt correction of any defect.

Thus it has resulted that the fire at the Webster School, which for a short time occasioned intense excitement and much mental distress, is looked upon by all interested in our public schools as a happy event upon which we may congratulate ourselves and our children.

C. E. Illsley.

[1] It is worth noticing that something very like the Ravennese stilt is to be found in the ancient Egyptian architecture, in the form of a member, the *dé*, interposed between the capital and the entablature. In some forms of Saracenic architecture this stilt becomes a most important feature.

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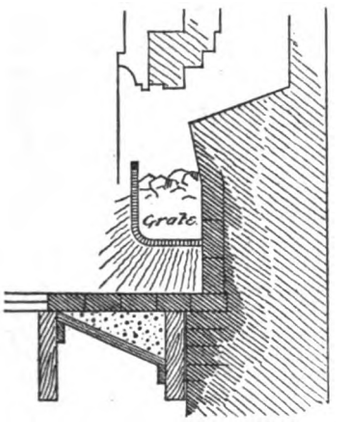
UNSAFE CHIMNEYS.

THERE was a slight fire in the house on Spring Street this morning occupied by Mrs. Tanner. It caught from a stove-pipe which ignited a partition and a bedstead. In extinguishing the flames Mrs. Tanner's hand was severely burned. The department was not called out. — *Newport, R. I., Daily News.*

Accidents like the above are reported almost every day. It is not surprising that they occur; the wonder is that we do not hear more of them — that the hasty construction of our day, the ill-digested plans, scanty use of materials, particularly in the construction of chimneys and fireplaces, are not followed by greater loss of life and property. Many chimneys, particularly in country houses, are built with but four-inch work, — a single brick between flues that are often over-heated, and wood-work, rendered doubly inflammable by constant exposure to excessive heat. If it would add anything to the weight of these words, I could give many illustrations of the reckless manner in which flues and fireplaces are often constructed, but will offer but one specimen of such scamping.

The house in this instance was built for a summer boarding-house. The owner and the builder got it up, after their own ideas, and they worked together very well. It has three chimneys, one of which is used wholly for stoves, and is without a grate or fireplace. The kitchen is in the basement, and is furnished with a range. The thimble for the laundry stove passes through a lath-and-plaster partition and enters the back of the kitchen chimney. The laths touch the thimble, just as they did in the house above described, occupied by Mrs. Tanner. There are five of these thimbles in the house, each two and a half feet above the floor, and all set in the same way. When not in use they have tin covers; one excepted, and over that one house paper is pasted. The laundry stove connects with the same flue. Of the three fireplaces in the house but



one is properly set. The manner in which the others are built is shown in this sketch. The trimmer touches the chimney at a point where the fire is the strongest, and the brickwork directly under the grate rests upon the trimmer. There is consequently but two inches of brickwork above the trimmer. The ash pan and fender help to break the force of the heat; this, coupled with the fact that the grate has only been used in the spring and fall, explains why the trimmer has not been on fire. The fireplace on the second floor is built in the same manner. There are no marble or stone hearths, but in place of them sheets of zinc, fourteen inches wide, are put down for coals to drop upon, should they fall out of the grate.

Any one at all familiar with the subject will see at once that the above is a regular fire-trap; that a more dangerous mode of construction could hardly be devised. And yet the owner of such a house has not the slightest difficulty in insuring it. Were it otherwise we should hear less of this class of fires.

It is hardly worth while to say that this method of building is reprehensible, and should at once be denounced, for it would have but little weight with men who strive to build at the minimum cost, and who rarely ask how their dwellings are put together, if they can get them at their own figures. The builders, not having money enough to do their work as it should be done, do the best they can, and leave the rest to chance. The moment they are paid they lose their interest in the work, and the owner takes care that some insurance company assumes a good part of the load.

The insurance business as now conducted is not a paying one. Old companies wind up their business because they can make no money, and smaller ones come to a stand because they can no longer go on. This state of things is owing in great part to a sharp competition, and the frequency of fires. Competition not only brings about low rates, — rates too low to do a living business, — but it also leads to the taking of risks that should never be assumed by any company, not even as extra hazardous.

Insurance companies sometimes combine, adopt a schedule of prices, to which they engage rigidly to adhere; but when the pressure comes some one yields, another follows, and then the pace is "go as you please," until another effort is made to establish and maintain uniform charges.

Now if insurance companies would establish and adhere to one rule, that they would take no risk on any building that had not previously been examined by their own inspectors, there would be fewer fires and less complaint of small returns on their capital. The inspectors should be trained architects, acting wholly in the employ of the insurance companies. Every store, dwelling, or church offered for insurance should be examined, from garret to cellar; the inspection to be followed by a report, headed with the name and location of the premises. It should then contain a full and minute description of the manner in which the premises are heated, the location and dimensions of the furnace (if one is used) and of any badly contrived and badly set fireplaces and stove-pipe thimbles, illustrated with diagrams where they are needed to make the text clear, with such advice as to how existing evils should be treated as will readily suggest itself to one competent to fill such an office.

An inspector of this kind might be profitably employed on buildings that have been in use for a number of years, as well as on those that are still in the hands of the builder; particularly at a time when application is made to renew a policy. A favorable report, after an exhaustive examination, would give confidence alike to the insurer and the insured; while an adverse report would put the company on its guard, and at the same time it would be a warning note, that would lead any man of ordinary intelligence to see that defects in his premises were at once removed.

Probably no one insurance company would feel able to carry out a plan like this; but if a number of companies were to combine, the expense to each one would be light compared with the advantages to be derived from such an arrangement. Each company would have a copy of every report, whether it held the policy or not, and these reports could be so made that when brought together they could be classified and bound up alphabetically.

Much has been written about sanitary reforms; this is well. Let the work go on. But while we strive to free our premises from deadly sewer-gases, let us not be unmindful of the risk we so often run, in houses heated in a way that endangers the life of all the inmates.

CHAMPLIN.

THE PERMANENT EXHIBITION.

THE Board of Managers of the International Exhibition Company has issued its third annual report, covering the operations during 1879. This report states that the trust mortgage of $50,000 in bonds of $500, with interest at six per cent, was executed under date of February 1, 1879, and that the stock-holders are now the owners of the building, less the mortgage; that the place is now lighted with petroleum gas at one fifth the former cost; that the position of the exhibits has been changed so as to give additional space, and other improvements made; and that the building and grounds are in a fair condition.

In reference to the fence which has been complained of by the Park Commission, the report says: —

"The board fence enclosing the grounds is sound and in good repair, and serves the purpose well for which it was originally intended, and it is deemed judicious and business-like to allow it to remain rather than go in debt for an expensive and showy one, your Board believing that when the financial condition of the company will allow, the surplus funds should rather be spent in making the institution more interesting and instructive on the inside than in spending it for show on the outside."

The receipts were as follows: Admission during 1879, $104,391.68; during the previous year, $39,627.21; receipts from other sources, including amounts collected for State Fair premiums, $29,835.82; from other sources in 1878, $19,728.24. The total expenditures in 1879 reached $120,314.03, and in 1878, $58,302.57. The liabilities consist of capital stock, sundry creditors, etc., to the amount of $352,450.99. The assets embrace the main building and fixtures, valued at $346,327.36, and a cash balance of $13,833.47. The total number of admissions during the year were 450,864, against 297,430 in 1878. The report also states that since the notice of the Park Commission directing the building to be removed the number of exhibits have been very much reduced, many of the exhibitors having sent for their goods under the belief that the notice was final. The exhibits returning from Paris and intended for display here, were not received for the same reason. There remain in the building at present 1,655 exhibits against 2,011 on January 1, 1879.

MECHANICS' APPRENTICES.

THERE was an apprentice case in one of the courts recently which brought up a very important subject which deserves particular consideration apart from the merits or demerits of the controversy between this one master and this one apprentice. The apprentice sued his master for not having taught him some of the most important features of the trade which he was apprenticed to learn. The jury rendered a verdict in favor of the master, which indicated that they did not think the case of the apprentice a good one. But how many masters in these days do really teach their apprentices all that they nominally agree to teach them? The trade-unionists theoretically base their peculiar attitude toward the apprentice system on the ground that apprentices are, in the majority of instances, not taught as they should be, but that they are, instead of being instructed in all the mysteries of a trade, merely instructed in certain specialties. How much the present peculiar relations between master and apprentices are due to trade-unionism, need not now be dis-

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cussed. We have simply to recognize the fact that the old-fashioned apprentice system has completely broken down, and that there is an urgent necessity that there shall be a substitute provided for it, in the interests not only of individuals but of the whole community, which will be beyond the reach of malign and selfish influences, exerted on the one hand by masters who are anxious to get men's work out of boys at less than men's wages; and, on the other hand, by workmen who, in their dread of competition, seek to prevent boys from learning trades at all. — *Philadelphia Telegraph.*

CAST-IRON IN FURNACE CONSTRUCTION.

To the Editor of the American Architect:

Dear Sir, — Mr. Philbrick, in the last issue of your journal, criticises the deductions I have drawn from my experiments on the permeability of cast-iron, and bases his criticism on the supposition that I found a pressure of two or more atmospheres necessary to cause mercury to pass through cast-iron.

Inasmuch as I not only distinctly stated that "the *feeblest* pressure was sufficient," but also cited in corroboration the experience of Professor Gibbs, in which *no pressure at all* was used above the vessel holding the mercury, I can only account for his objections on the ground of oversight. What I meant by the expression "feeblest pressure" will be seen from my subsequent remarks on furnaces, and might, it seems to me, have been understood by the critic.

As for the matter of drum furnaces, I referred at the time to furnaces as they *are* and not as they *should be* built, and did not say or imply that this outward pressure existed in all furnaces at all times, but that in all furnaces it was *liable* to exist at *any* time, and that in ordinary *dome* furnaces it existed in ordinary use at all times.

Respectfully yours, J. Pickering Putnam.

RIEVAULX ABBEY.

71 Broadway, New York, January 26, 1880.

To the Editor of the American Architect:

Dear Sir, — In your paper of the 24th January you publish an elevation of the east end of the choir of Rievaulx Abbey, Yorkshire, England, purporting to be drawn by D. A. Gregg, and copyrighted by Houghton, Osgood & Co. I think that as it is an exact copy of the lithograph published many years ago by Mr. Edmund Sharpe in his Architectural Parallels, there should have been some recognition of the source from which the drawing was copied.

Yours respectfully, Frederick C. Withers.

[We regret that the loss of the memorandum which accompanied Mr. Gregg's drawing allowed us to publish as his own work the illustration referred to. Mr. Gregg was particularly careful to explain that his drawing was but a copy from Sharpe's Parallels. — Eds. American Architect.]

NOTES AND CLIPPINGS.

The Free Entry of Works of Art. — The following circular has been issued by the Treasury Department: —

"Section 2,505 of the Revised Statutes provides for the free entry of 'works of art, paintings, statuary, fountains, and other works of art,' the production of American artists, and requires that the fact of such production shall be verified by the certificate of any consul or minister of the United States indorsed upon the written declaration of the artist. Under this provision the Department has heretofore required the payment of duties at the time of the entry of such articles for consumption unless the certificate alluded to above was then furnished. It has been found, however, that in many cases in which the work of art arrived before the certificate, or in which it was impracticable to produce the certificate until after the entry, the rule caused undue inconvenience to the artists concerned. You are therefore instructed to accept a bond from the importer, with good and sufficient security in a penalty equal to double the duties, conditioned for the production of such certificate within ninety days from date of the entry, and thereupon to deliver such works of art without requiring the payment of duties thereon. Before such delivery, however, a declaration from the artist, under oath, should be filed, showing that he is a citizen of the United States and that the work is his production."

Improved Tenement-Houses. — The "Improved Dwellings Association" of New York is organized with a capital of $500,000, for the purpose of erecting improved tenement-houses for the poorer classes of the city. The association has just made the purchase of twenty-one lots bounded by First Avenue, Seventy-first and Seventy-second Streets. It is vacant property near the river, with excellent drainage facilities and good air. The building to be first constructed will be built upon a square of sixteen lots, and it is expected that it will be finished within a year. Efforts will be made to erect tenements upon the most improved plans, which yet can be rented at from $8 to $12 per month for each set of apartments. The land was purchased from the Colford Jones estate. The association is looking for some suitable place down town where it can put up similar buildings.

The New Palace for the Emperor of Japan. — The construction of the long-talked-of new Imperial Palace in Japan has at length been commenced. The building will cover 20,000 tsubo of ground, and half of it will be in accordance with foreign ideas of architecture and half Japanese. It is supposed that four years will elapse ere the edifice is completed, and the estimated cost is 4,000,000 yen ($3,988,000). The Imperial Palace at Kioto, which was built by the Tokuawa Government, cost the sum of 3,000,000 yen ($2,991,000).

Foul Cistern Water. — People who draw their drinking water from a tank in the attic, which is too often left uncovered and consequently receives gradual accretions of dust and dead insects, and still more those who drink water from cisterns which receive the wash from roofs, are often annoyed at finding the water no longer potable, because of its unpleasant taste or smell and its probable unhealthfulness. Investigation often shows that while the water near the bottom is foul, the water near the top is sweet and potable. How this condition of things can exist is shown by the experiment which Sir William Thompson made some time since during a lecture at the Royal Institution in London, which illustrates the extreme slowness with which the diffusion of liquids takes place. Nine days before the lecture he prepared several glass tubes, into which solutions of sulphate of copper, common salt, and colored alcohol, solutions whose specific gravity are radically different, were poured carefully, so that they might not be mixed during the operation. The lines of demarkation were carefully noted, and on the night of the lecture it was found that diffusion had taken place only through some three inches in vertical depth. Sir William stated that several years before a tube thirty feet in length had been filled with similar solutions, and the observations then made led to the conclusion that it would take one thousand years to complete the intermingling of the liquids. This shows a bad lookout for the man who, finding by the water he pumps up, that the strata at the bottom of his well are foul, does nothing to cleanse his well, but relies on the spring thaw or the fall rains to bring about a salutary change in the condition of things. Tanks that have become foul, when they are fed through a supply-pipe and ball-cock, are apt to remain foul, until emptied and cleaned, because the inflowing water enters in small quantities, nearly at the level of the water standing in the tank, and flowing over the surface of this water does not so stir up and diffuse the befouling matter that it can be drawn off gradually. The fouling of tanks and cisterns can be prevented in two ways: by introducing the supply near the bottom of the tank, so that any sediment there may be is stirred up whenever fresh water enters; or by having the over-flow draw off the water from the bottom of the tank. This can be done by arranging a pipe as if it were to be used as a siphon to draw off all the water in the tank. To prevent the pipe acting like a siphon a small hole is filed in the upper side of the bend, and the pipe can then act simply as an over-flow fed from the bottom of the tank.

Stand-Pipe. — An enormous metallic reservoir or stand-pipe, said to be the largest in existence, has been lately furnished to the New York Water Works by the Cunningham Iron Works of Boston. This structure is 150 feet in height and 6 feet in diameter. The first fifty feet from the foundation is constructed of $\frac{1}{4}$ inch metal, the next fifty feet is of $\frac{3}{8}$ inch metal, and the remaining portion of $\frac{5}{16}$ inch metal. This is double riveted on the round-about seams, these seams being strengthened on the inside by strips of $\frac{1}{4}$ inch metal, 6 inches in width, and the edges of the plates are nicely planed, so that they will *match*, not *lap*, as is usually the case when they are thus riveted to the inside strip. The stand-pipe rests upon a cast-iron foundation, weighing 18 tons, which in turn rests upon a stone foundation, measuring 15 feet square. Around the pipe is built a circular wall of brick, 24 inches in thickness, the distance between the wall and stand-pipe being also 24 inches. This brick wall contains windows at intervals of about 10 feet, which give light to a spiral staircase which winds around the pipe to the top of the structure. There are 32 courses of plates in this pipe and the weight is 60 tons. — *Commercial Bulletin.*

The Theatre at Oberammergau. — The following account of the new open-air theatre at Oberammergau, which we mentioned a short time ago, has appeared in the Berlin *Börsen-Courier:* The part for the spectators, which will accommodate between 5,000 and 6,000 persons, is built in the form of an amphitheatre, the greater portion being uncovered, and only the part near the entrance, where the better places are, being roofed over. There are 100 rows of seats, each row to contain 60 persons. The cheaper places have wooden benches. The better places, which are raised, will have cane-bottomed chairs. Exactly as in the great theatre built for the Wagner festival at Bayreuth, the orchestra will be placed quite out of view of the spectators. In front of the stage, which will be closed in on three sides and covered, is a great space at the two sides of which the chorusses will be ranged. The new building has cost the commune up to the present 40,000 marks (£2,000), which has been defrayed from local sources. If we add to this the expenses which must be incurred for providing new dresses, scenery, etc., we may put the cost of the production of the Passion Play in 1880 at from 60,000 to 65,000 marks (£3,000 to £3,250), without exaggeration. The admission prices will range from 1 to 8 marks (1s. to 8s.), according to the position of the places. The number of persons who will be engaged in the performance, including children, will be between 650 and 700. Of these, 19 will be actors and solo singers. The orchestra will consist of 30 performers. Almost the entire population of the district will have some share in these gigantic representations. Inquiries made at Munich relative to the cost of providing the new wardrobe having resulted in proposals which seemed too high, and which the villagers did not think they could prudently risk, it has been resolved that all the new dresses shall be made on the spot.

Keeping Gutters free from Ice. — The *Fireman's Journal* says that the Berkshire Life Insurance Company is to try an experiment to rid the roof of its building in New York of snow and ice. A one and one fourth inch perforated steam-pipe is being laid in the gutters on all sides of the building, and another on the centre of the roof. One of the boilers is arranged to be detached from the other, to keep the building's temperature right, and it is thought that after every snow-storm the steam will be sufficient to clear the roof in half an hour.

An Ancient Bottomless Well. — There is a remarkable well in the town of Thurman, situated along what is known as the "river road." The well is about three and a half feet in diameter at the top, and its depth has never been ascertained. It has been sounded 555 feet without reaching the bottom. The water is clear and cold, and the well is always full. It was first discovered about ninety years ago, and its sides were then walled up with stones, as they appear at the present time. — *Glens Falls (N. Y.) Republican.*

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WE learn by telegraph the bare fact, without farther explanation, of the death of Mr. E. M. Barry, R. A., late President of the Royal Institute of British Architects, and Professor of Architecture at the Royal Academy. He was born in 1830. He was a pupil of King's College School, in London, and first studied architecture under the late Professor Donaldson. From Professor Donaldson's office he went to that of Mr. T. H. Wyatt, and later to that of his own father, Sir Charles Barry, whom, at his death, in 1860, he succeeded as architect to the New Houses of Parliament, then not quite finished. Since that time his name has been conspicuous among English architects. His first important work, we believe, was the Covent Garden Theatre, which he built in 1857. He was architect also of the Opera House at Malta, of St. Saviour's Church at Haverstock Hill, of many schools, hotels, and other buildings, public and private, among them the Charing-Cross Hotel, well known to travellers, and the great hotels at Cannon St. He completed the Halifax Town-Hall, left unfinished by his father. In 1867 he won in a competition of designs for the extension of the National Gallery, and was at the same time one of the successful two in the great competition for the New Law Courts, Mr. Barry's design having been selected on account of the excellence of his plan, and Mr. Street being associated with him for the sake of his architecture; or, as Sir Gilbert Scott astutely puts it in his Memoirs, "the judges . . . . desired to give their verdict in favor of Mr. Barry, but as his architecture was approved by no one, they conceived the idea of linking on to him some other architect, in whose architectural powers they had more confidence, and they pitched upon Mr. Street, whose arrangements no one had ever spoken in favor of." This decision of the judges was set aside, however, and in the end the government appointed Mr. Barry as architect of the Gallery and Mr. Street to the Law Courts. Later, when it was decided to alter Burlington House for the use of the Royal Academy, Mr. Barry was appointed to that work also.

MR. BARRY was, like his father, a consistent advocate of the classic styles, to which he naturally first turned under Professor Donaldson's instruction; and when he turned aside to Gothic design he did it only in obedience to outside pressure, as his father had done in the Houses of Parliament. At the time of the Law Courts competition Gothic was so universally in favor in England that it was a foregone conclusion, and Barry, like the rest, submitted a Gothic design, though it is our impression that he was one of the two or three who added an alternative in Renaissance. His want of aptitude in what was probably to him a masquerade may have been reason enough for his fortune in this competition. Mr. Barry's success was perhaps due as much to his personal character and opportunities as to special ability as an architect. He was thoroughly educated to his work, and well trained in the collateral knowledge that gives quality to an architect's work. He appears also to have been a man of sound sense and tact, of catholic feeling, popular in his profession as well as outside of it, always ready to uphold its claims and to represent it with credit before the public. His lectures before the students of the Royal Academy, as professor of architecture, are scholarly, practical, and full of a right professional spirit. He preceded Mr. Whichcord, now in the chair, as president of the R. I. B. A., and his administration brought in several changes that seemed to rouse new life and activity in the Institute. He was quick to champion the rights of his profession, and fought manfully in defense of his own when the late Mr. Ayrton, once commissioner of Public Works, demanded the surrender to the Government of the plans of the Houses of Parliament; although the arbitrary temper and the authority of the commissioner prevailed in the end.

THERE is a curious confirmation of some things we said the other day about insurers in the report, just published, of a committee of the underwriters of Philadelphia, which had been appointed to consider the shortcomings of the fire department of their city. After touching very briefly on the chief causes of inefficiency, — inadequate distribution of water, an untrustworthy fire-alarm, insufficient extinguishing apparatus, and politics in the department, — the report quits the subject abruptly, saying that "the committee fail to see how the underwriters of this city, as such, have any duties to perform in the direction of improving the protection against fire." As citizens, they may deplore the inefficiency of their fire department, but as underwriters "their business is to pay for fires, not to prevent them." The only thing they have done in favor of protection is to establish fire patrols, and it is doubtful, says the report, if this has been profitable to the companies, inasmuch as it has cost them more in reduction of premiums than it has saved in losses, since a great deal of the property saved by it has been property not covered by insurance, and saved therefore, not to the insurers, but to the community. Finally, the report declares that when the underwriters shall have advanced their rates to the point which the insufficient protection of the city requires "they will have done their whole duty to their stockholders and policy-holders." The committee therefore recommends no action concerning protection.

HERE is opportunity for a casuist to ask whether the question of duty is to be so easily disposed of. On the assumptions of the report its conclusions are perfectly logical; but we may ask if an insurance company has no duties except to its holders of stock and policies, or if an institution which owes its existence to a state charter has not some duties to the public. If the underwriters could be absolutely neutral in the matter of danger from fires it would be another thing; but their natural influence is to increase the common danger by taking away from individuals the chief motives for precaution. In fact, we may say that it is one of their main functions to encourage people to endanger their neighbors by carelessness. It is impossible for them to help affecting the security of the public in this respect, and so, whether there is any legal way of holding them to it or not, it is morally their duty to see that their influence on the whole is not in favor of peril; that is, that their natural influence in one direction is offset by a positive effort in the other. Corporations are the subjects of the state as much as individuals, share its protection, and are held to contribute to its expenses in the same way; and are alike morally responsible for their influence in the community. It is not the thing, therefore, for underwriters to quietly waive all concern for the public safety in a matter which is directly connected with their business and affected by their own conduct; or to argue that they are relieved from responsibility, which is duty, when they are free from legal or business obligation. There is this difference, moreover, between the corporation and the individual: that the corporation, unlike the other, is the creature of the state, which may therefore the more reasonably assume to control its action for the sake of its influence, if there appears a way to do it. If then the underwriters, the observed tendency of their business being to aggravate a great public danger, should assume to waive responsibility for it, and refuse to exert the counteracting power which their business puts into their hands, the state would be justified in regarding them as dangerous to the public, like lottery agents, usurers, keepers of gambling houses, and others who make their profit out of the necessities or inordinate desires of other men, and who, though a convenient refuge for the individual at a crisis, may be a more than compensating injury

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to the community. The recklessness of life-insurance companies has already provoked state interference, and if fire-underwriters should elect to cast off their responsibilities the same interference might become necessary in their case.

The discussions before the Society of Arts have resulted in the proposal by Mr. Atkinson of a system of protection against fire for blocks of buildings in cities, which is developed out of the experiences of mill-owners. There is apt to be great difficulty in delivering water on the roofs and upper floors of high buildings, from the engines in the streets, with volume and force enough to be effective in fires, and this even though the pressure in the mains may be enough itself to carry the water to the level where it is wanted. It is also difficult and dangerous to carry lines of hose filled with water up four or five stories, especially on the outside of buildings. He proposes then that each block in the dense business quarters of a city should be provided with outside stand-pipes at three or four points, rising to the tops of the buildings. These stand-pipes should connect with the high water service of the city, if there is one, should have hydrants at the tops only, and should lead to a system of horizontal pipes distributed over the roofs, with gates and hydrants at each party-wall. When the pressure of the water is insufficient the stand-pipes should connect with three or four steam-pumps in the buildings. The whole should be under control of a corps of engineers and watchmen, and ladders reaching down from the roofs to the second story should be fixed at convenient points on the walls of the buildings for access. He estimates that such a service of pipes (without the pumps) could be provided for about sixteen hundred dollars per acre of buildings. The fifty acres which were burned over by the Boston fire, with a loss of about eighty millions of dollars, would at this rate be provided for at a cost of eighty thousand dollars, which he estimates to be about one fifth of the annual premiums for insurance, and a seriously destructive fire would then, he thinks, be almost impossible.

There would be doubtless considerable advantages in a supply of water laid on in this way, and in some emergencies it might prove of very great importance. It is, however, hardly of a kind to take the place of any other precautions, and must therefore be regarded as so much added expense. Whether owners could be induced to adopt it would depend on what reduction underwriters were willing to make in premiums to those who used it; but this, as underwriters go, could probably not be discovered till the invention had been tested by actual use, which would be likely to develop conditions that do not suggest themselves at first. One or two obvious difficulties do suggest themselves. One is the difficulty of keeping so extensive an apparatus, very rarely used, in working order. The owners could not be trusted to do this, for, as we have argued in speaking of other analogous cases, it is a rule that appliances which are intended only for rare emergencies are found out of order when these emergencies occur. It could be effectually cared for only by some one whose special business it was, — the contriver of it suggests the underwriters' inspectors, — and it would be open to many injuries from exposure and weather. It is a question, too, how far it could be depended on in very cold weather; and, as we know, fires have an awkward trick of breaking out in just such weather. It is not sure that water could be made to go very far into an iron pipe chilled down to the zero point, as such pipes would often be, without being caught by the frost. Still, the experiment is one that we may be very glad to have tried, when any one, owner or underwriter, is ready to risk the expense of it.

The fire in the Kings County (New York) Penitentiary, a few days ago, was of an alarming and suggestive kind. The workshop which took fire was a brick building with wooden floors, two hundred and fifty feet long, containing three stories and an attic. In this building were at work five hundred convicts, male and female, and more than three hundred workmen from outside. A fire was first discovered under the main staircase, where it was luckily put out, without raising an alarm. Immediately after, another fire was discovered in the attic; only the energetic action of the officers saved a panic and a stampede. Promptness and good discipline succeeded in getting the prisoners safely out of the building and back to their cells, without any escape, so far as is reported. This is very creditable to the officers of the prison; but it is not so creditable to its system that near a thousand convicts and other workpeople should have been crowded together at work in such a building. It seems little less than a miracle that the prisoners and workmen should have been so extricated and controlled without disorder; and it would not be wise to count on the repetition of such a miracle, while the repetition of the fire would not be miraculous, if it was the work of incendiaries, which is inferred from the fact that it broke out simultaneously in two places far apart. The collection of all the women in the third story very nearly led to hopeless confusion; and doubtless would have done so if the fire had not been most opportunely put out before it got headway under the staircase, to which all crowded at the first alarm. If a panic had once fairly set in, and the convicts got beyond control, — as they would have been likely to if they had been a little less quickly handled, or if their exit had been obstructed, — frightful disorders would have followed, of which the least might have been a general jail-delivery. The movement against convict labor has not been urged on very reasonable grounds; but, if the labor is managed in this way, the less of it the better. The authorities of Kings County have food for other reflections than those of self-congratulation. They are said to be considering what had best be done with the remains of their workshop, which was but half burned. We would suggest that the best thing to do is to pull away the upper stories of it, and then provide the second story with a mill floor and stairs that cannot be set on fire. The loss of accommodation would be best made up by another workshop.

A bill has been introduced into Congress by Mr. Wells, Representative from Missouri, to incorporate Captain Eads and others into the International Transit Company, for the purpose, as we understand it, of carrying out the scheme of a ship-railroad across the Isthmus, devised by Captain Eads, which we described in our issue of July 5, 1879. No location of route is specified in the bill, which only provides for "constructing such works across the isthmus between North and South America as may be necessary to admit of the passage of ocean vessels." To aid in this the President is instructed to detail two ships-of-war, and a corps of engineers from the army and the geodetic surveys to make surveys of location, and an appropriation of two hundred thousand dollars is made to carry on the surveys. The United States are to aid the company to secure rights of way across the Isthmus, and, if the company fulfils its obligation to construct its works within seven years, are to bind themselves not to grant similar concessions — that is, are to give the company a monopoly — for fifty years, in return for which Congress shall have a right of revision over the tolls. We may hope, now that it has shown its face in Congress, that this unassuming proposition may be consigned to permanent and becoming oblivion in the pigeon-holes of its appropriate committee. Meanwhile what we might call, if politics were our business, the Monroe boom is advancing, and seems to be mixing itself up inextricably with the canal question. We even hear rumors, ingeniously contrived for its support, we fear, of a tripartite alliance between Great Britain, Germany, and France to carry through the Lesseps canal in face of American opposition, and also a report of a mysterious purchase of land by our Government, hitherto unheard of, which gives us a controlling interest along the line of the Panama canal. We find even so discriminating a statesman as Senator Bayard making before Congress, with applause, the oddly inconsequent remark that the canal scheme "is one of world-wide importance, and the heart of every American proclaims that it is to be under the control of the Government of the United States," — all which looks as if Congress were in danger of losing its balance and were easily scared by bugbears.

The interesting discoveries of antiquarians in our Western States have provoked the issue of a host of questionable stories, one of which we had occasion to contradict as a hoax a few weeks ago, after quoting it from a western paper. Prehistoric caves figure largely in these stories. The most imposing one that we have seen is in a recent letter in the Philadelphia *Telegraph*, which spares none of the usual embellishments of architecture. The correspondent, writing from Monroe County, Mo., was brought to a cave entered by an elliptical arch, which "for gracefulness of curve and elegance of finish is not excelled by any of the works of the present day." It was faced with smooth granite, which reflected the torches like polished steel. The springer of the arch rested on an entablature, and that on a column, also of granite. The arch led to a chamber excavated in limestone rock, fifty by thirty-five feet, with vaulted ceiling

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forty-five feet high, the walls adorned with twelve granite columns, carrying capitals and carved bases. On a dais at one end was an altar capped with a polished granite slab. On the right was an anteroom with arched doorway. The thing, says the correspondent, is attracting the attention of archæologists, as well it might. Whatever its truth, the story is not *bien trouvé*.

GOTTFRIED SEMPER. II.

GOETHE'S celebrated saying that "a tendency to theorize is always the sign of a defective or dormant productivity," of which the great writer was himself in later years so marked an illustration, cannot be applied to Semper. He, indeed, wrote less at Dresden than during other times of his life, but only on account of the great pressure of his official occupation. While he built the monuments which render the Florence of the Elbe one of the most pleasing cities of modern Germany, he still continued to project literary works, and he delighted in arranging a celebrated performance of Antigone.

This Dresden period bore much the same relation to the life of the impulsive and revolutionary Semper as did a like experience to the life of Richard Wagner, who in full measure then shared his characteristics. Both were geniuses: shaping for themselves a way through the artistic chaos of our times they certainly deserve that much abused term. Both came to Dresden before they had accomplished any of the works for which they now are celebrated; they executed there, at the same time, what they had for years been preparing, works which immediately took the highest position in the modern art of their country. Both were in direct action upon the barricades of the revolution and were exiled on the same day, to meet in Zurich: their paths have since often run parallel. Personally the upright roughness of the architect, hypochondriac and cynic as he often was, was more lovable than the character of the revolutionary musician, the disclaimer of luxury, since a royal favorite and an æsthetic autocrat. Semper, artistically, but not personally, ambitious, was universally beloved by those who stood near him, though his restless energy often amounted to irritability.

The life of Semper in Dresden was brought to a sudden end by the part which he took in the uprising of May, 1849. An energetic republican, he erected a barricade in one of the streets near the post-office, which was itself a structure worthy of the builder's reputation, and for three days withstood the fire of artillery, defended to the end by its brave architect, who was one of the last to leave the blood-stained streets of the city. It is characteristic of the man that, flying with a price upon his head, condemned to death by the reigning power of Saxony, without a country or employment, hardly with the means of most immediate existence, he was cool enough to stop at Freiburg, on his way to France, and thoroughly study the cathedral, as had long been his desire. Thus was Semper for the second time obliged to seek refuge beyond the borders of his country. From Paris he seriously intended emigration to the United States, and it must be accounted a loss to our callow architecture that he was deterred from this step by a call to London. Here his suggestions and example were of the greatest value for the foundation and organization of the Kensington Museum, where he was for a while instructor. Semper may be said to have made that institution what it now is, in as far as such a task is possible for an individual.

In the mean time his design for the museum of Dresden was carried out, unfortunately, in his absence, not wholly according to the intentions of the designer. The plans had been prepared a little over a year before his sudden exit from the city, and he had himself laid the corner-stone. The museum is in general composition a worthy counterpart to the theatre, and will long stand as a model, especially of the interior arrangement of galleries. The harmony of the building with the Zwinger, which it adjoins, is wonderful, when the quiet grace and dignity of the one and the lawless architecture of the other are considered.

Semper soon felt England to be no field for his practical abilities, and, though he there found leisure for the collection and digestion of much of the material subsequently embodied in his work on style, he willingly accepted a position at the Polytechnic School in Zürich, which institution he raised to the height which it still maintains. In Switzerland he effected much the same salutary change in architectural practice that he had before in Saxony. Zürich itself was ornamented not only by various private dwellings, but by the completion of the Polytechnic Building, with its grand vestibule and Genoese richness of composition. Winterthur was made celebrated by Semper's town-hall, one of his favorite designs. The citizens of that little town have since learned that the advantage of possessing one of the best architectural monuments of the age cannot be too highly valued. Other projects, a Protestant church for Winterthur, and a vast plan of a festal theatre for Munich, made for the present king, have not been executed. The latter is, without doubt, one of the most imposing conceptions of Semper's life.

The before-mentioned fire of 1869 rendered a rebuilding of the Dresden theatre necessary, and this was intrusted to its former architect, who received an honorable and entire amnesty. Indeed, the Saxon legislature would only vote the necessary funds on the express condition that Semper should be recalled and the work placed in his hands. It would be difficult to imagine a greater tribute to professional excellence in monarchical Europe. The new theatre, recently completed, is one of the most massive and brilliant structures of Germany, a wisely planned organism truthfully expressed; still it hardly attains the quiet harmony of the earlier and less pretentious building.

The last decade of Semper's active life was devoted to Vienna; designing new works, superintending the restorations of the palace, and working with von Hasenauer upon the two new museums and the Burgtheater. His plan of connecting the museums with the proposed additions to the palace, uniting them by grand triumphal arches over the busy streets, making one composition of these structures, is so stupendous an architectural undertaking that it may safely be predicted that its extent and the present condition of Austrian finance will prevent its posthumous execution. Semper's life ended in Rome, where, under the cypresses of the stranger's cemetery, his grave is crowned with well-deserved laurels. His living impulse will be more and more felt as the present generation advances in the difficult task of restoring to architecture its true character.

Semper's designs made trial of every style, from the Venetian palace architecture of the Oppenheim house to the graceful Gothic of his Cholera Brunnen in Dresden. But his preference was for the Renaissance, — a Renaissance, however, not adapted entirely from the great Italian masters of the cinquecento. Semper had studied the remains of the imposing structures of Rome with as clear an understanding and in much the same sense as did Brunelleschi and Bramante. The architecture of imperial Rome, "that petrified idea of a world-wide domination," delighted Semper, and to his mind "compared with the architecture of the Greeks as a symphonic instrumental concert compares with a hymn accompanied by the lyre." He was truly an original master of the Renaissance, and his works, approaching more nearly to the modern necessities and conceptions which are yet to form the architecture of the present advancing civilization, are, perhaps, more worthy of study than the designs of Italian masters of three hundred years ago which have become absolute catechisms of professional instruction. Architectural forms, when used in other ages than those in which they were developed or decided, are a mask. A "style" is nowadays that dress in which the nakedness of the modern art of building is wont to cover itself for genteel parade. With Semper, however, the pediments and pilasters of the Renaissance are, at least, a powerful means of architectural characterization, and are often so modified as to be peculiar to him. It is to be regretted that his studies of Greek antiquity were so exclusively restricted to polychromy. Color was in ancient times one of the most powerful means of the builder. Characteristic of his time in that one respect, Semper was unable to use this means. Most of the men of the present age seem, by long inactivity of their sense, to have become architecturally color-blind. Semper was by nature eminently a master of form, and his architectural studies of ancient color showed to him, as unfortunately to most, little more than an incomprehensible historical phase of past architectural art. Semper's professional speech betrays but slight familiarity with Greek forms. He had learned mainly from Roman adaptors, not from Hellenic creators, and this still further marked him as of the Renaissance. As an architect of the best spirit of the cinquecento he cannot be too favorably judged. He attained with Roman forms a nobility of effect, a delicacy and cheerful warmth, which is rare in that highest period of Italian art.

But great as Semper was as a designer, proud as Zürich, Winterthur, Vienna, and above all, Dresden, may be of his buildings, he is greater still as a thinker and author. Nothing is rarer than so fortunate a combination of artistic creative power with profound theoretical knowledge. Scattered as many of the smaller essays are, a complete collection of his writings is to be desired. The publication of the theatre, with its valuable suggestions of acoustical and theatrical importance, has been cited above. The most extensive book, the work upon which Semper's reputation will chiefly depend, is Der Stil in den Technischen und Tektonischen Künsten. The last edition was published at Munich in 1878. It is badly arranged, incomplete, opens with an unnecessary and abstruse consideration of the most elementary conceptions, it abounds in digressions, and is throughout of very uneven value. But however embarrassed by what must be regarded as ballast, its absolute value is very great The following are the smaller works and essays of Semper which are known to the writer. The list may, perhaps, not be absolutely complete, but nothing of importance is wanting.

Scoprimento d'antichi Colori sulla Colonna di Trajano. Bullettino dell' Instituto di Corrispondenza archæologica. Roma. 1833.

Vorläufige Bemerkungen über bemalte Architektur und Plastik bei den Alten. Altona. 1834.

On the Study of Polychromy and its Revival. Museum of Classical Antiquities. London. 1851.

Die Vier Elemente der Baukunst. Braunschweig. 1851.

Wissenschaft, Industrie und Kunst. Braunschweig. 1852.

Observations on some Specimens of Metal-Work. Marlborough-house. London. 1853.

On the Origin of Polychromy, in Apology for the Coloring of the Greek Court, by Owen Jones. London. 1854.

Ueber die formelle Gesetzmässigkeit des Schmuckes und dessen Bedeutung als Kunstsymbol. Zürich. 1856.

Ueber die bleierne Schlendergeschosse der Alten. Frankfurt.

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1859. An attempt to demonstrate the dynamic origin of certain forms in nature and art.

Ueber Baustyle? Zürich. 1869.

An extended work, Vergleichende Baulehre, projected by Semper and advertised by Vieweg in Braunschweig, 1852, seems never to have been published.

Semper as a writer is forcible and terse. His logical exposition of that of which he is convinced is brilliant. In controversy he was unsparing and sarcastic. The style is characteristic of the man. His faults were lack of order, perhaps often of application, and a certain irregularity and unevenness too often peculiar to great minds. Had he been less apt to lose his time and lame his energy in conviviality he might have avoided these. But, as it was, he was a profound and clear thinker, and one of the best practical architects of modern times. Architecture seems to have lost its impetus and steerage-way since the Renaissance fell into the whirlpool of the Rococo, and the impetus of so powerful a mind in the present crisis, in the confusion of a new start, cannot be too highly prized.

J. T. C.

ELEVATOR SHAFTS. I.

The following suggestions are offered to the profession by one of their number who has had considerable experience in advising in relation to the disposition and arrangements of elevators, with a view to relieving them of the objection that they tend to increase the destructiveness of fires in burning buildings.

Elevators being of two kinds, designed for the conveyance of freight or passengers, the elements of danger resulting from fire are the same with both. Therefore all elevators are subject to the same considerations with reference to the fire question.

All elevators may be divided into two classes, — open elevators and shaft elevators, — and it is presumed that people will have one kind or the other as suits their convenience. Until recently freight elevators were generally open and passenger elevators were enclosed. Now many of the former are closed, and some of the latter open. A favorite method with passenger elevators is to enclose them simply with wire guards from floor to ceiling, or to run them up in light holes or in the well-holes of stairways. In the last case they have no enclosure whatsoever, and do not cause additional openings in floors.

Any increase in the number of floor openings in a building increases the chances for fire to spread with facility. If the floor-openings are super imposed the best conditions for causing a draught are attained. Supposing that no means are used to prevent fire from communicating with the several floors by either hatches or doors, the shaft elevator is the most dangerous. It is a flue in which the flames gain intensity. They burst out through the side openings on every story, while their whole remaining force is spent in the uppermost story. If furnished with a large ventilator at the top or a glass roof, the flames may find vent and may not be distributed, and the shaft may even draw in a current from every story. The value of this suggestion was recently illustrated by a fire in the Newhall House, Milwaukee. The upward current will always be less violent through open hatchways without enclosure, but the ultimate results are the same. When a shaft is enclosed with wood-work having sashes in the sides, the conditions for spreading fire are the best possible. The shaft itself furnishes additional fuel. A very slight fire in a basement may thus become a raging flame at the top of a shaft. The sashes break and the fire spreads in every direction.

All shaft elevators should be enclosed with brick walls from the foundation to at least six feet above the roof. All substitutes for bricks when used for this purpose are inferior and seldom less expensive. They may be admissible when it is desired to enclose an existing elevator, but there is no good reason why they should be used in new buildings. As it is often necessary to place the elevating machinery under the shaft or in one of its walls, thereby causing necessary openings, a small compartment should be built in the basement contiguous to the base of the shaft, of brick, and of sufficient size to contain such machinery. This compartment should have as small an entrance opening as possible, and it should be furnished with an iron door, with springs to keep it closed at all times, so that the opening between the compartment and the shaft may not be the means of communicating fire through it from the basement story into the shaft. As in all shafts which are perfectly closed at all openings, so as to keep fire from entering, the air is liable to become heated at times, a brick flue should be built from some place on the exterior of the building to the base of the shaft to supply fresh air. It should have no openings except at the two ends, and a sliding door at the elevator end will enable the conductor to regulate it at will.

All brick shafts should not only go through the roof, but should be furnished with good-sized ventilators at the top. With a fresh-air flue at the base and a ventilator at the top the air will be constantly renewed by the pumping action of the elevator as it ascends and descends.

Every shaft elevator should have, in addition, a skylight on the top. This is for two purposes. First, to furnish light. A skylight covering the entire top of an elevator will always give all the light needed, whether it be a freight elevator without a cover, or a passenger elevator with a glass or wire top, no matter how high the shaft is. It is far better than side windows, which are entirely unnecessary, and are useful only when the elevator is below them. The second purpose of a skylight over a shaft elevator is to supply something which will be quickly destroyed and give the largest possible vent to the flames and smoke should they enter the shaft. For this reason the thinnest glass is the best to use; and to avoid the danger of firebrands from without falling down the shaft the glass should be covered with fine and strong wire netting placed six inches above it.

It is needless to add that every shaft such as I have described should have a good iron door at every opening, and that such doors should always be closed except on the floor where the elevator is required for use. The openings should be only as large as required for the nature of the business to be done, both as to width and height. On a freight elevator it is usual to make them nearly the full width of the elevator and on a passenger elevator they are seldom needed more than three feet in width. There are very few cases in which it is necessary to make an elevator door more than seven feet high, and all the doors should be of the same height. It is best on freight elevators to leave eight inches of brickwork on each side. It is not necessary that the doors should be heavy, such as those required to close openings in party walls. It should be remembered that the main object of an elevator door is to keep the fire and smoke out of the shaft until the appliances for putting out a fire arrive on the spot, and it is not essential that they should have the resisting power of a vault door. The doors should be sufficient, however, to keep any flame which might enter the elevator from below from spreading at the several floors, and to carry it to the vent at the top, where it may escape harmless. Therefore they should be stiff, and so secured that they will not warp when suddenly heated. They should be light, so that they can be easily handled. A latch and hinges are not sufficient to prevent warping. The best method is to secure the door in slides, so that no dependence is placed on hinges or latches. As the doors are liable to be heated on the inside by fire entering the shaft from below, they should not come in contact with any woodwork. It is best, therefore, to place them on the inside of the shaft between the car and the wall. A patent door now in extensive use in Chicago best serves this purpose. It slides up and down in iron grooves. Being divided horizontally in the middle, the lower half (which is hung by chains passing over pulleys to the upper half) descends as the upper half ascends. The parts are latched when they come together. The door also has automatic attachments, so that it can be opened and closed by the movement of the elevator.

As the openings to freight elevators must be nearly as wide as the shafts, there never is room to slide a door sideways on the inside of the shaft, and if a sliding door is placed on the outside it is liable to obstruct valuable room. The same objection holds with swing doors; but the main one is that on account of their great width they have to be hung in two folds, which adds to the labor of handling them. Iron doors have been used on the outside of shafts which slide upwards in grooves, and are counterbalanced by weights. But with such doors there is twice as much weight on the chains and pulleys as in the doors which divide in the middle, and the wear and friction are double, requiring twice as much labor to lift them. They have to be raised and lowered seven feet at a time, while the movement in operating the counterbalanced door is only half as much. The conductor has to step off of his elevator to open and close them, while he can manage the counterbalanced door from his place.

All doors on freight elevators should have latches on the inside only, so that they are entirely under control of the conductor. When so provided they cannot be tampered with or left open by unauthorized persons. It is a necessity that every shaft elevator should be furnished with a signal bell having pulls on every floor, so that the elevator can be called when desired, and then only is there any necessity to open the door. No power elevator can be safely run without a regular conductor. Any elevator, however safely constructed, whether as to protection of human lives or against fire, becomes a dangerous machine when operated by unauthorized persons, or by any number of persons who may have access to it.

The main points to be observed in all shaft elevators are, first, to keep the fire out of the shaft, and, second, if it gets into it to let it pass harmlessly through the top. In case of this last contingency, if the shaft is properly constructed, when the fire is quenched at the point where it originates no further danger may be apprehended from the existence of the shaft.

With regard to passenger elevators in shafts it may be said that any such thing as an attempt to make them fire-proof is almost unknown. There are very many with well-constructed brick shafts, but with wooden doors having open panels fitted with wire-work on every story. Such elevators, it seems needless to say, are the worst kind of fire-flues that it is possible to have. The doors are generally double, one a movable door which when opened slides past a stationary one. Some passenger elevators are made more safe against fire, but less convenient, by having a single wooden door, hung on hinges, and opening outward on each story. It seems to be a preconceived idea with those who build elevators and with many who use them that it is necessary for the passenger to *see the elevator coming* and *for the conductor to have a full view of every floor* as he passes it. Yet all such elevators are invariably provided with signal bells, so

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that the elevator can always be called and the conductor can always tell where he is wanted. These ideas are born simply from habit, and are based only on the belief that what has been must always be. It has been objected also, and has even been found by experience where the doors have had glass panels, that to close up the shaft causes the air in it to become very hot. This is so; but the method of ventilating the shafts which I have pointed out above is always feasible and does away with this objection.

There can be no practical objection to making passenger elevator shafts thoroughly fire-proof in the manner that I have pointed out for freight elevators, the opening on each floor being reduced to the smallest dimensions consistent with convenience. The use of fire-proof iron doors with automatic attachments will satisfy the conductor who wants to see each floor as he passes, for the doors will open and close as he goes by each floor. But to make the use of such fire-proof doors entirely convenient it is necessary that the cab be provided with a sliding door having a wire panel. This door should not be opened except to let passengers on or off, and if no one desires to land or get off, and the elevator passes an opening, there will always be the closed door of the cab in front of it, so that practically there will be no opening and the gazers will be equally satisfied. It should be a rule also that every conductor should be obliged to open the cab door *after* stopping and close it *before* starting. The amount of labor for the conductor, who is by the old method constantly engaged in opening and closing doors on the platforms, will be greatly diminished, and he will only have his cab-door to manage.

Inasmuch as both shaft and open elevators can be made reasonably safe against fire, the decision as to whether to have one kind or the other should be controlled mainly by its location in the building. A shaft elevator should be used only where it cannot obstruct valuable light; as, for instance, anywhere in the interior of a building. If placed against an exterior wall it will generally occupy the space of a tier of windows, and if the windows are introduced to carry out the exterior symmetry they are useless to the elevators, since a skylight, which is needed just as much, would suffice. In the case of a store where goods are to be taken directly from the exterior on to the elevator it may be advisable to enclose the first story only in order to keep out draughts of wind from the street entrance, but it is best to have an outside vestibule with fly doors and to arrange the shipping room around the elevator, making the elevator open all the way up, having only a guard for protection against accidents. But if the shipping room is in the basement it is best to enclose the elevator with sash-work in the first story only, and depend upon hatches to close the floor-openings.

ROMANESQUE ARCHITECTURE.[1] III.

IT certainly seems to me that, in these great Italian churches, we have before us a distinct round-arched style, an independent form of architecture worthy to rank side by side either with the architecture of the entablature or with the architecture of the pointed arch. One of the three great forms of construction, a form constructively as good as either of the other two, is here provided with a good and consistent decorative system. It is hard to see what more is wanted. It is hardly possible to conceive any architectural forms more perfect and stately than the arcades of the nave of Pisa. The decorative forms are consistent and elegant; in some, indeed, of the later buildings of the style, especially at Lucca, they put on an almost extravagant richness of detail, but yet without departing from the purity of the round-arched ideal. But if we admit that the columnar form of the Italian Romanesque is a pure and genuine style, that it is a legitimate decorative carrying out of one of the great types of architectural construction, it follows that the architecture of classical Rome must be looked on as something imperfect and transitional. The Romanesque of Pisa and Lucca is the classical Roman set free from the incongruous elements which clung about it, set free from all traces of the days when Roman architecture was a mere imitation of Grecian form. The one Grecian feature which could be really adapted to the Roman principle of construction has been adopted and naturalized, and it has been proved to be capable of doing as good service in the new system as it did in the old. If here and there traces of another system of decoration may be found hanging about the buildings of this style, they are in positions so unimportant as to be of little consequence in the general effect. They in no way interfere with the claim of the columnar Romanesque to be looked on as a pure and independent style, as the consistent carrying out of an architectural conception which the classical Roman attempted only very imperfectly. Paradoxical, then, as the position may sound, I think that I have made out my case, and that the classical Roman is essentially an imperfect style, a mere transition to the more perfect Romanesque.

But the columnar Romanesque of Italy was not the only architectural form in which the round-arched construction clothed itself. Another variety arose which was an even more legitimate development of the Roman manner of building. This was that form of Romanesque which cast aside the use of the column as a main constructive feature, and rested its arches on vast square piers. The column, where it was used at all, was used only as a purely decorative feature, as a mere nookshaft in the angles of the rectangular piers. This mode of construction, also, was of Italian birth: we see it in the great Lombard churches of Milan and Pavia, and it spread itself in different forms over all the lands north of the Alps. We see it in its greatest purity in those German buildings of which I have already spoken, where the main arcades exhibit the square pier and the round arch as their one feature. And we find a great number of forms which we may call intermediate between the column and the square pier. We find rectangular piers so surrounded by attached shafts that the columnar element, though purely decorative, is that which has most share in the general effect. And we find piers of cylindrical form, sometimes of distinctly columnar form, which have little enough in common with the graceful monoliths of Ravenna and Lucca. In England, above all, we find those enormously massive round piers which by no straining of language can be called columns, but which are rather to be looked on as masses of wall analogous to the square piers, only taking a cylindrical instead of a rectangular form. And, though the construction of the square pier and that of the column are quite distinct in idea, we constantly find them mingled together in practice, not only in contemporary buildings in the same country, but even actually in the same building.

Now to the purely classical mind it is perhaps harder to admit that the Northern Romanesque is a genuine and perfect style of architecture, one to which the classical Roman was a mere transition, than it is in the case of the columnar Romanesque of Italy. There is a temptation to set aside the Romanesque buildings as not forming any really distinct style of architecture, to look on their earlier forms as the mere expiring traces of Roman art, and to look on their later forms as the mere foreshadowing of the coming Gothic. There is a temptation to do this even in Italy, and north of the Alps the temptation naturally becomes still stronger. In the earlier examples of the Northern Romanesque the work, it cannot be denied, is often of extreme rudeness. And even in the later and more finished forms of the style, such as our own enriched Norman, stately and noble as is the general effect, the mere detail, when it attempts anything coming strictly under the head of sculpture, is apt to be much less beautiful than grotesque. But the question is not as to the merit of detail, but as to the consistency of the constructive and decorative systems. The Northern Romanesque, no less than the Southern, carries out boldly, honestly, and consistently that round-arched construction which the classical Roman timidly strives to mask. It might be an untoward accident that ages which stood very high in the art of strictly architectural design stood very low in the art of merely decorative sculpture. But this does not affect the general principle. The Romanesque style, Northern as well as Southern, the style of Normandy and England no less than the style of Italy, succeeds in carrying out that principle of construction which the classical Roman failed to carry out. I hold then that the works of the early Cæsars are to be looked upon as simply transitional between the pure style of the entablature and the pure style of the round arch; they are simply imperfect attempts at a mode of building of which one type was carried to its highest perfection at Pisa, and another type was carried to its highest perfection at Durham.

Romanesque architecture then is neither a mere corrupt Roman nor yet a mere imperfect Gothic. It is a genuine independent style; it is the highest development of the construction of the round arch, just as the Grecian is the highest development of the construction of the entablature, and Gothic the highest development of the construction of the pointed arch. As an architectural conception, it stands on equal terms alongside of the other two. In historic interest, to one who fully grasps the history of civilized man as one long unbroken drama, I do not hesitate to say that the buildings of the Romanesque ages surpass the buildings either of purely classical or of later mediæval times. No buildings of earlier or of later times bear about them the same charm as those which arose at the bidding of Diocletian, of Theodoric, of Justinian, of Charles, and of William. The one city of Ravenna, standing like an isthmus between two worlds, rich in the tombs and temples of the last Italian Emperors and the first Teutonic Kings, might alone supply matter for the study and meditation of a life.

Of both forms of Romanesque, the columnar type and that which employs the massive square or round pier, Italy is alike the parent. But as one type reached its highest perfection in Italy and the other out of Italy, the one by the banks of the Arno and the other by the banks of the Wear, we may fairly speak of them severally as Southern and as Northern Romanesque. This division is purely constructional, without any reference to the dates of particular buildings. As works of art, Spálato and Torcello, eight hundred years apart, must be placed closer together than either of them stands to the great mass of buildings which came between them. But we must also cast a glance at the history of the Romanesque style as looked at from a more strictly chronological point of view. A long study of the subject in various parts of Europe, in the course of several journeys, some of which were undertaken for the special purpose of studying Romanesque architecture, has, I trust, enabled me pretty well to trace out the history of the style. In that history, as far as Western Europe is concerned, I can discern two main periods of very unequal length. The former drags out its being from the third century to the eleventh, without its being possible to draw any broad line at any intermediate point. The latter takes in the busy time from the middle of the eleventh century to the middle of the twelfth, one of

[1] See pages 28, 37, *ante*.

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the richest times of architectural development in the whole range of the history of the art. The main distinction between the two is that, during the former period, Italy set the fashion to the whole of Western Europe, while, during the latter period, most of the great countries of Europe, Italy among the others, struck out independent forms of Romanesque art for themselves. The buildings of the former class are comparatively rare, but they are scattered over all the lands from the Orkneys to the Pyrenees and the Alps, and they everywhere bear the most striking likeness to one another, and the most undoubted signs of being imitated from common Italian models. The buildings of the latter class are to be found in abundance everywhere, and they strike the inquirer by their remarkable diversity, a diversity shown not so much in their detail, which is often strikingly alike in countries far apart from one another, as in the general character of their architectural conceptions. The former class, till somebody helps me to a better name, I shall speak of in a body as Primitive Romanesque. The different varieties of the latter class are best called after the countries in which they severally arose or were brought to perfection, Norman, Aquitanian, German, Italian, or any other. In England the two classes are commonly known as "Saxon," or "Anglo-Saxon," and "Norman." The latter name is a thoroughly good one, if only people will not speak of "Norman," "Early English," "Decorated," and "Perpendicular," or of any other less familiar set of names, as four or seven styles or periods on a level with one another. The later Romanesque of England was undoubtedly of Norman invention, and it was brought into England under Norman influence. But the use of the word "Saxon" to express our few and scattered examples of the earlier form of Romanesque is liable to all the objections which always apply to the vague use of that misleading name and also to some further objections special to itself. Besides the absurdity of talking of Saxon buildings or Saxon anything at York or Lincoln, the name further suggests the idea that the Saxon style was something peculiarly English, whereas our surviving Saxon buildings are simply rude examples of a style common to England with the rest of Western Christendom. The first Christian buildings which were reared in Britain after the English Conquest were said to be built after the Roman fashion,[1] and after the Roman fashion they went on being built till the Normanizing Edward brought over a new style of building from his beloved Normandy.[2]

THE ILLUSTRATIONS.

STONE HALL, WELLESLEY COLLEGE, WELLESLEY, MASS. MESSRS. WARE & VAN BRUNT, ARCHITECTS, BOSTON.

This is a hall of chambers arranged for a family of one hundred girls, the older students of the college, and is intended to provide them with all the requisites of a home, including dining-rooms, kitchens and laundries, one hundred and four chambers or studies, with smaller parlors for social uses and a large general parlor, with an open-timber roof, overlooking the lake. The space occupied by the music rooms on the plan of the second story will be devoted to other purposes, it being in contemplation to erect a conservatory for musical instruction in another part of the grounds. The building occupies the entire summit of a low hill, the slopes of which are well wooded, about four minutes' walk from the main college buildings. Its walls are of brick and terra-cotta, and the interior partitions are also of brick throughout, without wood furrings. All the external walls are vaulted with eight-inch spaces, and the corridor walls are built with flues for ventilation and heating, the latter communicating with hot-air chambers in the basement, which are furnished with steam radiators. The conditions of the gift, for which the college is indebted to Mrs. Valeria G. Stone, of Malden, Mass., are that the building shall be built and furnished, ready for use in all respects, at a cost not exceeding the sum of $100,000. The contracts are made and the foundations in place, and the building will be completed and furnished a year hence, within these limits of cost. Messrs. A. E. & O. L. Giddings, of Exeter, Mass., are the general contractors.

DETAILS OF STONE HALL, WELLESLEY, MASS. MESSRS. WARE & VAN BRUNT, ARCHITECTS, BOSTON.

INTERIOR OF THE DINING-ROOM IN THE HOUSE OF J. A. BURDEN, ESQ., TROY, N. Y. MESSRS. POTTER & ROBERTSON, ARCHITECTS, NEW YORK, N. Y.

THE RESTORATION OF ST. MARK'S.

A glance at a photograph of the church will show even those who know nothing technically of architecture that the central dome and the domes of the nave are supported by a series of vaults, of which the four chief — those of the nave, apse, and two transepts — carry directly the weight, being supported in turn by a secondary series, which are again supported by a lower series, in which, on the south side, the baptistery is situated. On this side the main vault of the transept is cracked open by the yielding of the secondary supports and the outer wall of the baptistery which takes the thrust in the last instance. This crack, now repaired as well as it can be, was, however, extending before the late repairs on that side, and it is easy to see that the farther yielding of the foundations of the outermost wall and piers beyond a small limit must have brought the whole of the south side of the nave with the corresponding transept into ruin. And it was precisely in these foundations that the most negligence was shown by the builders in preparing their work, as may be seen by the floor of the baptistery, which rises in the centre many inches above its margins.

Before the repairs of this south flank began, I think about 1865, the wall on this side was cloven apart vertically so as to be sustained principally by the iron clamps used in the construction, and which were by oxidation reduced in places to a thickness of less than half an inch. The lovely little canopy which forms the southern extremity of the façade had its outer columns reared on a foundation of rubble extending scarcely beyond the bases of the columns, and only a foot and a half thick. The whole south flank, as may be seen by the cornice, which runs the length of the façade, has sunk several inches more than the north flank, the worst result of which appears in a serious crack over the central door of the main edifice.

The first thing to be done, then, was to arrest this greater subsidence of the southern wall, and as this menaced a fall into total ruin from the fissures in the brickwork underneath the shell of beauty which alone seems to have excited the anxiety of the public, there was no choice but to take the old wall down and reconstruct it on solid foundations. The shell had to be taken down and the brickwork renewed, in the course of which operation it was found that the builders, to procure temporary cohesion of the masonry, had laid short beams of wood in the work, which time and his helping had reduced to dust. This brickwork relaid and braced strongly to the inner wall, which remained, the shell was restored to its place as well as could be. This is the renovation which the lovers of art, some ignorantly and some from the feeling that it were better to let the buildings go into slow and complete decay than to mingle new with old, have cried out against. On this score Commendatore Meduna justifies himself, I think, satisfactorily by showing, first, the photograph of the portion in question, before it was disturbed, side by side with one taken recently, and that in the photograph there are only two visible alterations, viz., the abolition of a sixteenth century monument in sufficiently bad taste which had been obtruded there, and the restoration of the northern small window to its original shape, indicated by the remains of the mullion and tracery, which he has religiously preserved; and secondly, by showing the condition to which the shell had been reduced, the slabs composing the veneer of the wall being reduced to fragments (where not fallen away in dust), which it was impossible to handle, much less restore to their places. This may be understood by any one who will look at the condition of the adjoining doorway on the façade, where the marble slabs are in some cases so corroded as to crumble under the touch, and only held to the brickwork by bolts and braces, many in fragments, and all gaping so as to show the extensive erosion of the brickwork underneath. But in the restoration this veneer is, with the exception of two small columns in the colonnade above and some capitals, the only new material used in the whole work, every column of the lower range being of the original and nearly every capital; some of the latter being the original bolted and cemented together to preserve as far as possible every fragment of the old work, — some capitals being in half a dozen pieces, — only two being new; and the old columns are not even recut, at most having their inner surfaces, less acted on by the sea air than the outer, turned outward.

The mosaics on this flank have been religiously preserved, as well as all the sculpture in the arches; the two niches above having been filled with wood and canvas solidly fastened together in a block and the wall cut away from behind them, and when the new masonry was ready they were restored to their places. Unfortunately, the portion which strikes the eye of the visitor is the new veneer of gray marble identical with that which was originally used, but the new surface of which jars on the sense of color. Time will harmonize it, but meanwhile a wash of sulphate of iron would remove the rawness without injury, as there is no sculpture or design of any kind in it. One must go over this section of work, already finished ten years, piece by piece, as I have been, to understand the extraordinary zeal with which the architects have labored, not to renew, but to preserve, every fragment of the old handiwork, the substitution of new sculpture being a fraction of one per cent, if things may be so stated, of the old retained. Your space would not permit me to detail all the precautions taken by the architect to preserve the exact relations of all the parts, even to the curve of the great window on this side.

On the north side, again, the decay of the veneer compelled the renewal of most of it; but every piece of sculptured stone is restored to its original place, and the veneer in general is of the same stone as the original, the only exception being that verde-antique, the quarries of which are unknown, is replaced by the nearest approach to it which was attainable in Europe.

So much for what has been done. As to what was proposed by the architect's plan, so far from a general demolition of the façade being intended, the plan of immediate operations consists in removing the veneer and its relative columns of the doorway nearest the southwest angle, the refacing of the corroded brickwork, and the re-

[1] On these early churches see Bæda, Hist. Eccl. i. 33 (cf. iii. 4), and Vita S. Benedicti, § 5. Benedict Biscop brought builders from Gaul to build "juxta Romanorum morem." The arts of Italy, Gaul, and England were the same.

[2] Will. Malmb. Gest. Reg. ii. 28. "In eadem ecclesia die Theophaniæ sepultus est, quam ipse illo compositionis genere primus in Anglia ædificaverat quod nunc pene cuncti sumptuosis æmulantur expensis."

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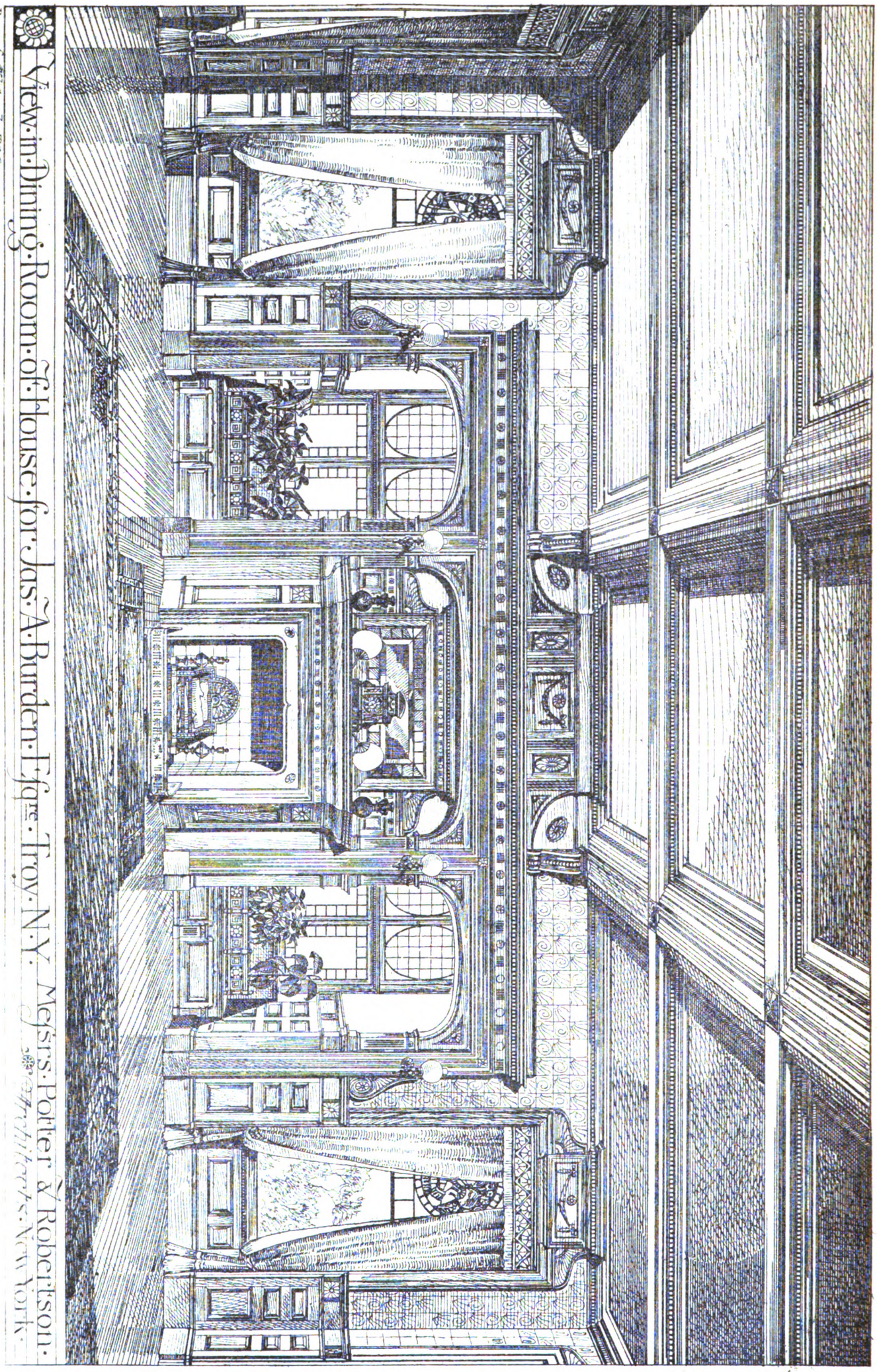

View in Dining Room of House for Jas. A. Burden, Esq^re, Troy, N.Y. Messrs. Potter & Robertson, Architects, New York.

Drawn for the Engraver by Z.A. Gould.

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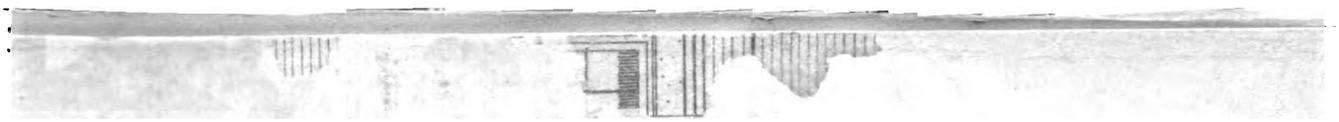

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storation of the old columns, cornice, etc., to their place, with replacing of such slabs of the veneer as are absolutely unfit for further use. The whole of this is now held in place by wooden supports and iron and copper bolts, without which, and especially the huge beams of wood which now carry the whole of the upper columns on one side, the entire shell would fall in. Here the substitution of new material will be very slight, and involves no sculpture or column. The second doorway, adjoining the central, needs, and will receive at some not far distant time, the same treatment, but the employment of new material there will be even less than in the southern doorway. The whole veneer, not only on the façade, but in the portico and on the front of the church proper, is falling away from decay of the bricks in the masonry within, but the walls themselves are regarded as sufficiently secure, nor has there been, the architect assures me, any plan entertained for a demolition and reconstruction of the front of the church, or for the disturbance of any part, beyond the facing of marble and the columns which flank each doorway in two tiers, unless in removing this shell the brickwork should be found to be more gravely compromised than is now suspected. The northern canopy is much more displaced than any other part of the façade; but as it does not affect the stability of the church, it will not be disturbed, though much disfigured by the iron bars necessary to keep it from falling.

The only step which the most fastidious person who desires the stability of the church can object to is the levelling of the cornice which runs the whole length of the façade of the portico, and which, while keeping the true line, has sunk at the south end several inches, evidently during the construction of the church, as the irregularities of the foundation are most apparent, as well as the correction of them by making the space between the keystones of the arches and the cornice above them of unequal breadth. In the reconstruction of the southern canopy this portion of the cornice has been raised to a level with the northern extremity, a change which I think is to be regretted, as the irregularity of the building throughout, though mainly due to bad foundation and construction, had been condoned and compensated for in the subsequent operations, and this alteration will necessitate the bringing up of the portion of the cornice over the next doorway to the same level, to avoid the break in the line.

As to the mosaics, the same system has been followed. Every part of the mosaic which could be kept together has been preserved, and the work now going on in the baptistery is merely the removal of parts of the mosaic which are actually crumbling and cannot be secured to the wall by any device. The ceiling is cracked in every direction by old cracks, now arrested, and these cracks have involved the mosaics in strips and patches, which are being restored, and in general so well that from the scaffold on which the mosaicists are at work it was difficult to distinguish the old from the new, even when pointed out to me. — *Venice Correspondence of the London Times.*

CORRESPONDENCE.

THE BUILDING TRANSACTIONS OF THE PAST YEAR.

NEW YORK, January 8, 1880.

THE report of the Superintendent of Buildings for the last quarter of the year 1879 covers one of the busiest years which the Department has had. In number of plans offered for inspection and in the amount of proposed cost the figures of the year 1879 show most forcibly the return of the season of business prosperity. Locally, the report has an important bearing, as showing what the establishment of rapid transit has done for the metropolis. It was not until 1878, and in June of that year, that the elevated roads began their actual work. It was too late in that year for any general attempt on the part of land-owners to take advantage of them; but by the opening of the building season of 1879 everybody was convinced that the roads were to fulfil their objects, and such as were prepared began to build houses with a vim, and all the year through the upper wards have been crowded with workmen. In plans offered the numbers were, first quarter, 211; second quarter, 344; third quarter, 199; fourth quarter, 2 6; making a total for the year of 960 plans, or 2,065 houses, as many of the plans were for rows of houses. This was against a total of 753 plans in 1878. In the matter of alterations the returns show the number of plans to have been, first quarter, 339; second quarter, 491; third quarter, 262; and last quarter, 209; or a total of 1,301, embracing changes to 1,373 buildings. During the year 1,739 new buildings have been commenced and 1,417 have been completed, while of alterations the figures for both classes were 1,226. There were in progress, when the year opened, 741 new buildings; and when the year closed 1,045 were in the hands of the builders. In the matter of alterations, 117 were in progress at the opening and 126 at the finish of the year. Comparing the year with its predecessors as far back as before the panic of 1873, the returns show: —

Year.	No. of Plans.	Estimated Cost.	Year.	No. of Plans.	Estimated Cost.
1872	1,728	$27,884,870	1876	1,379	$15,903,880
1873	1,311	24,936,535	1877	1,432	13,365,114
1874	1,388	16,667,417	1878	1,672	15,219,680
1875	1,406	18,226,870	1879	2,065	22,567,312

The Board of Examiners, who are supposed to act as an advisory body to the Superintendent, had 28 meetings during the year, and considered 262 petitions for modifications of the building law on new buildings, of which 221 were granted, and of 162 petitions for modification on alterations, 118 were granted. That part of the duty of the Superintendent which gives him authority to make existing buildings safe has been vigorously enforced, though not too much so. For eighteen years past the record of this department stands: —

Year.	Made Safe.	Taken Down.	Year.	Made Safe.	Taken Down.
1862	49	16	1871	892	62
1863	96	53	1872	398	38
1864	71	37	1873	819	58
1865	86	33	1874	1,466	67
1866	225	32	1875	1,586	90
1867	335	22	1876	1,531	71
1868	235	22	1877	1,088	67
1869	305	38	1878	856	77
1870	478	52	1879	650	56
				11,166	891

The quality of the several buildings and the channels into which the money spent in building has gone may be seen in the following table:[1] —

	Number.	Estimated Cost.
First-Class Dwellings	764	$10,362,400
Second-Class Dwellings	253	1,018,650
French Flats	253	3,672,200
Hotel	1	25,000
Tenements	399	3,537,750
First-Class Stores	32	1,126,000
Second-Class Stores	11	78,500
Third-Class Stores	16	20,475
Office Buildings	12	364,500
Workshops	80	699,914
Schools	6	166,000
Churches	5	33,200
Public Buildings	22	824,050
Stables	85	391,713
Frame Houses	126	246,900
	2,065	$22,567,312

The locations of the buildings may be seen in the next table, giving the number of buildings offered from each ward, with the estimated cost.[2]

Ward.	Number of Buildings.	Estimated Cost.	Ward.	Number of Buildings.	Estimated Cost.
1	11	$271,200	13	12	$51,950
2	3	105,000	14	13	421,000
3	2	160,000	15	17	509,050
4	5	36,000	16	30	282,800
5	17	169,850	17	19	121,325
6	5	77,900	18	24	382,635
7	14	143,450	19	678	10,564,350
8	29	467,054	20	53	476,300
9	41	351,450	21	41	892,395
10	10	79,000	22	162	1,753,033
11	25	115,150	23	158	568,575
12	668	4,649,895	24	28	38,000
				2,065	$22,567,312

Superintendent Dudley, in speaking of the work of his Department, says to the mayor, "I would respectfully call the attention of your honor to the marked increase in the building operations of the past year, plans having been submitted for a greater number of buildings than during any year since 1872. This increase requires constant vigilance on the part of the officers of the Department, to detect and prevent infractions of the law, and although the plans submitted during the past year provided for the construction and alteration of 557 more buildings than those of the year 1878, 421 less violations of the law are reported, which indicates a disposition on the part of owners and builders to more fully comply with the requirements of the law."

There have been many important buildings which will date their beginnings from the year just closed. Much of the building has been of architectural importance, and in the way of departure from

[1] First-class dwellings are those intended for occupation by one family only, while second-class may be occupied by more than one. The distinction between French flats and tenements is often a very meagre one, the general rule being to style a house a French flat when each family has its own water facilities, and otherwise to class them as tenements. Third-class stores are one-story affairs, or mere hawking sheds.

[2] The city, as is well known, is a long and narrow island, with the recent addition of the Twenty-third and Twenty-fourth Wards in the lower end of Westchester Island. They are as yet very rural, and all the frame buildings are in their precincts. Cutting the city across at Fortieth Street, the Nineteenth, Twelfth, Twenty-second, Twenty-third, and Twenty-fourth Wards lie above that line, and all the other wards south of it.

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the old routine brown-stone front. Several of the private residences are specially noteworthy. Following somewhat the order of their entry, some of the more costly of the buildings are noted below.

The freight-receiving depot of the Cunard Steamship Company, covering their dock, cost $40,000; a business building on the site of the Grinnell Building, so widely known as Delmonico's, Fifth Avenue and Fourteenth Street Place, cost $60,000; it is of brick and stone, and is from the hand of one of the young architects in the city; No. 113 Fulton Street, iron-front stores, $50,000; brewery for Geo. Ehret, Ninety-third Street and Second Avenue, $75,000; the bachelor apartment-house on Washington Square, cost $65,000; a quaint structure, made such by special design, but having a very modern purpose and motive; the car-house of the E. C. Railroad Company, at One Hundredth Street and Third Avenue, is merely a shed, with some interest in construction, cost $100,000; private house on Fifty-seventh Street, near Fifth Avenue, for J. L. Riker, $45,000; the Sherwood Studio Building, Sixth Avenue and Fifty-seventh Street, cost $80,000; this curious structure, designed by its amateur-architect owner, is a model in its way, of the adaptability of means to an end; a flat at Fifty-ninth Street, near Seventh Avenue, $50,000; model tenements at Monroe and Corleers Streets, by Field & Son, so successful in the Brooklyn White Model Tenements, cost $45,000; 1 and 3 Bond Street, replacing the iron structure swept away by fire several years ago, $120,000; flats on Broadway and Fifty-fourth Street, cost $82,000; two private houses for Cornelius Vanderbilt, on Fifty-seventh Street, costing $45,000 and $75,000 respectively; private residence for David Dows, Fifth Avenue and Sixty-ninth Street, cost $125,000; the Stevens House in Wall Street, near Broadway, costing $200,000; the German Masonic Temple on Fifteenth Street and Second Avenue, cost $40,000; asylum for the Children's Aid Society at Gouverneur Street, cost $40,000; a stable at Fifty-second Street and Madison Avenue, for W. H. Vanderbilt, costing $40,000; the Seasongood Building, 83 Green Street, cost $40,000; iron-fronted store, 42 East Fourteenth Street, $45,000; residence for Geo. Opdyke, Fifth Avenue, near Forty-seventh Street, $55,000; the Tallman flat on Fifty-ninth Street, near Seventh Avenue, cost $75,000; a store on the Van Renssalaer property, 203 Grand Street, $40,000; the Bernheimer residence, 5 East Fifty-seventh Street, cost $40,000; reservoir and high water works, Ninety-seventh Street and Ninth Avenue, cost $64,000; house for indigent newsboys, Lafayette Place and Fourth Street, $111,500; store for Hon. Henry Hilton, on Twenty-third Street, $60,000; the Union League Club, $350,000; store at 8 East Fourteenth Street, cost $45,000; public school on Lexington Avenue, near One Hundred and Fifth Street, cost $53,000; and one at 209 East Forty-sixth Street, costing $56,000; Broadway and Clinton Place for the Sailors' Snug Harbor Store, cost $50,000; the flats on the Rhinelander estate, Second Avenue and Eighty-sixth Street, cost $110,000; 287 Madison Avenue, F. F. Thompson, residence, cost $50,000; residence for Cornelius Vanderbilt, Fifth Avenue and Fifty-seventh Street, cost $750,000; office building, No. 3 Courtlandt Street, cost $150,000; W. H. Vanderbilt, residences on Fifth Avenue, from Fifty-first to Fifty-second Streets, costing $400,000 and $300,000 respectively; the Dollger brewery, 422 East Fifty-fourth Street, cost $50,000; the store structure at Broadway and Grand Street, cost $120,000; E. A. Wickes, residence, 14 West Fifty-seventh Street, cost $40,000; residence on the Astor estate, 374 Fifth Avenue, cost $70,000; factory at Twenty-second Street and Tenth Avenue, cost $40,000; José F. Navarre, double house, 3 East Fifty-seventh Street, cost $50,000; stable for Cornelius Vanderbilt, 36 East Fifty-eighth Street, cost $50,000; residence of W. K. Vanderbilt, Fifth Avenue and Fifty-second Street, cost $200,000.

TESTING THE SUSPENDERS OF THE BROOKLYN BRIDGE.

At the last monthly meeting of the Brooklyn Bridge Trustees, an important report was submitted by trustee Isaac Newton, who was requested to test seven of the suspenders of the bridge in the machine in the United States Arsenal, at Watertown, Mass. The tested suspenders were chosen at random from those made for the bridge. The object of these tests was to ascertain the efficiency of the mode of securing the suspenders to the parts by which they are attached, respectively, to the main cables and to the suspended superstructure. These suspenders are attached to a wrought-iron fixture at one of their ends, and to a casting at the other end, by being inserted into conical sockets 3⅞ inches in diameter at the base of the cone. At the other end the diameter is just sufficient to allow the suspender to be passed through. The suspenders are secured in these sockets by spreading the wires which compose the rope, and then driving in the voids tapering pins of wrought-iron; the projecting wires are turned over, and the cavities filled with lead. The tests seem to show that turning over the wires and filling the cavities with lead do not add to the strength of the fastening. The length of the tested suspenders ranged from 18 feet 9½ inches to 24 feet 3 inches. The strain to which they were subjected varied from 141,000 pounds to 194,000 pounds. In none of the tests was the full strength of the suspender ropes themselves brought out, and in no case did the suspender pull out of its socket.

The maximum stress that can be brought on any suspender from the weight of the structure alone, or the dead load, as it is termed, is 8,200 pounds, and from the movable, or rolling load, 13,125 pounds, making a total of 21,325 pounds. The mean breaking-strain of the seven suspenders which were tried was a trifle over 168,000 pounds, or over seven times the strain which they will ever be required to stand. If the lowest breaking-strain of the seven tests — 141,000 pounds — be taken, the factor of safety will be about seven. Mr. Newton's report was received and ordered on file.

The executive committee reported that the amount required to complete the bridge is as follows: —

Estimated cost of the bridge, Feb. 1, 1879		$13,708,026 60
Expended at that date		10,103,558 54
Amount required Feb. 1, 1879		$3,604,473 06
Expended since that date up to Dec. 1, 1879	$1,006,262 04	
Cash on hand and receivable from two cities at this date	596,676 04	—$1,602,938 08
Remaining to be provided for		$2,001,534 98
Add for rise in land, materials, and labor 10 per cent since Feb. 1, 1879		$200,153 49
Add for contingencies		48,311 53
Grand total to be provided for		$2,250,000 00

This is subject to a reduction of an estimated credit to the bridge for gores and pieces of land left in purchases, amounting to $125,000. In this connection, the committee submitted the draft of a bill for presentation to the legislature, calling for an appropriation from New York of $750,000, and from Brooklyn of $1,500,000, for completing and opening the bridge to public travel. The bill directs the comptrollers of the two cities to borrow this money, and to pay the interest upon it until the completion of the bridge and its opening. It also relieves the trustees from paying, after January 1, 1880, the interest on the bonds issued by the two cities under the provisions of Chapter 300 of the Laws of 1875, and places this responsibility upon the cities themselves. The second section of the bill authorizes the trustees to dispose at public sale of such gores or pieces of land which they have acquired, but now consider unnecessary. On the motion of J. S. T. Stranahan the bill was approved unanimously. The financial condition of the bridge up to December 31, 1879, was reported as follows: Cash receipts, $11,332,257.26; cash expenditures, $11,216,431.93; cash balance in bank, $115,825.33. The cash liabilities amount to $76,839.55. — *New York Times.*

Colonel Paine is the engineer who has the sole charge of the wire. He says: "We had knowledge of the defective wire as well as of that which was approved, as it was all subjected to the same test. When the discovery was made that rejected wire had been put in the cables we thus had data at hand for ascertaining very nearly the strength of the defective wire used. As the two cables were carried on at the same time we were very nearly able to locate the place where it had been worked in. The deficiency in the strength of the cables was made up by the addition of approved wire. In making the calculation, where any question arose, an allowance was made liberal enough to exceed any possibility of defect. For this reason the cables are undoubtedly stronger than they would have been had there been no weakness to remedy. I would consider myself criminally negligent to allow any weakness at all in the cables. In a word, as the defect was more than made up by the addition of a good wire, the structure as it now stands more than meets the requirements. No one connected with the bridge has ever attributed the accident which occurred in June, 1878, to any defect in the wire, as has been alleged. The cable itself was sound, and broke from its fastening because the rope supporting it had been cut into by passing over the edge of one of the sheaves. Until after that occurred there was nothing but good wire used in the construction of the cables." — *Philadelphia Telegraph.*

THE DELAWARE SHIP CANAL.

The Secretary of War has transmitted to the Senate a letter from the Chief of Engineers, and accompanying it a copy of a report from Major W. P. Craighill, Corps of Engineers, of a survey made on the Peninsula of Maryland and Delaware, in compliance with the requirements of the acts of June 18, 1878, with a view to the construction of a ship canal, to connect the waters of the Delaware and Chesapeake Bays. The report sets forth that the surveys were conducted under the personal supervision of Mr. N. H. Hutton, beginning in August, 1878, and closing in January, 1879. Six routes are estimated for, as shown in the following table. [The lengths given are, respectively, from Baltimore to a common point at sea, twelve miles outside of the Delaware Breakwater. The distance from Baltimore by the route now used to the same point is 325 miles, or 33¼ hours, allowing a speed of ten miles in open water, and eight miles in dredged channels.]

Name.	Length in Miles.	Length of Canal Proper.	Cost.	Relative time of transit in hours.
Choptauk	149.81	37.67	$16,500,000	19.5
Choptauk (inland)	133.91	31.00	18,250,000	18.
Wye	128.42	42.99	26,333,333	17.75
Queenstown	107.29	53.78	37,250,000	17.
Centreville	106.38	50.95	41,500,000	16.5
Southeast Creek	115.78	38.35	25 000,000	13.75
Sassafras	129.25	16.20	8,000,000	15.1

[No 2. — The length of the Choptauk inland route is excluding Broadkill.]

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Mr. Hutton, in the course of his report to Mr. Craighill, says: "A review of the preceding figures and remarks would indicate that the Sassafras route is the shortest in time, and the cheapest route, but has very expensive approaches to maintain, and very serious conditions to overcome, if it is to be used during the winter. The Centreville and Queenstown routes are the most direct, rate second as to time, but cost largely in excess of other routes, have expensive approaches to maintain on the Chesapeake side, and are, as the Sassafras route, liable to obstruction by ice during the winter. The Choptauk route rates slightly below the Sassafras as to time of transit, and rates third in this respect, while it is second on the list in point of cost, its greatest advantages being in the matters of freedom from obstruction by ice and economy of maintenance of approaches." Mr. Craighill, in a supplemental report, dated January 8, 1880, states that the foregoing estimate for the Sassafras River route was based upon data derived from the report of Mr. B. H. Latrobe, on his survey of 1874. A new survey was executed in December, 1879, and as this route is preferred by many because of its being the cheapest yet estimated for, it would seem to determine the cost of enlarging and otherwise modifying the existing Chesapeake and Delaware Canal, which debouches into the Chesapeake Bay by way of Elk River, the entrance thereto being only a few miles from that of the Sassafras. The United States has already spent about $500,000 on the Elk River route. The new estimate for the Sassafras route amounts to $8,500,000, or about $500,000 more than the previous estimate. It is for a ship canal 100 feet wide on the bottom, 26 feet below low water; side slopes, one and a half to one, with a berme on one side 12 feet wide and 30 feet above the bottom. The other estimates are for a canal 100 feet wide at the bottom, 26 feet below mean low water; the width to be 178 feet at low water; the locks to have chambers 600 feet long and 60 feet wide; tide locks only to be built, and these will probably be generally open, and only exceptionally used.

CAST-IRON FURNACE CONSTRUCTION.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — I notice Mr. Putnam's letter in your last issue. He says my former criticisms were based on the "supposition that he found a pressure of two or more atmospheres necessary to cause mercury to pass through cast-iron," and accounts for my criticism on the ground of oversight. But such was not the basis of my criticism, nor do I wish to plead oversight. I based my criticism not upon any supposition that a pressure of several atmospheres was represented as necessary to show permeability in cast-iron, but upon this, namely, that the article in question (on page 20) described an experiment which the writer had taken pains to illustrate by a cut, showing a man standing on a stool pouring mercury into a gas-pipe and the mercury spirting about the floor. Taking this with the context, I drew the inference, perhaps unjustly, that the writer considered the permeability at high pressures as a matter of considerable consequence as an argument. If it was not described and illustrated with a view of its application by the reader to the permeability of the same material under pressures likely to exist in furnaces, why introduce it at all? If it cannot be so applied, then the experiment, with its illustration, seems to be irrelevant, and serves no purpose but to catch the reader's eye. All I intended to say was, that *if* so applied as an argument, I think it involved a *non sequitur*, and I think so still. If not introduced as such an argument, then I was wrong and beg the writer's pardon. While on the subject, I wish to refer to a statement in Mr. Putnam's letter, where he says that the outward pressure referred to and measured by the manometer, as described on page 20, is "in all furnaces *liable* to exist at *any* time." I do not agree to this, for I see no good reason to suppose such a pressure *possible* with a good smoke-pipe opening from the *top* of the furnace, as in case of Chubbuck's, illustrated on your page 30, and various other patterns of stoves. If such liability exists, it must be due to an explosion of gases, that ought never to be allowed and which can easily be prevented by ordinary care. At any rate, such incidents can hardly be said to be "liable to exist at any time." The original article states (page 19) that the use of cast-iron for gas-piping had been abandoned in favor of wrought-iron. I was not aware that cast-iron was ever used for gas-piping, except for sizes of two inches and over, it being too clumsy a material for small pipes. It is still in universal use for gas mains in streets, as also in factories and warehouses where the larger sizes are required for mains. Cast-iron is too heavy for gas *holders*, but is used universally for gas condensers and washers and such apparatus, with no sensible leakage. Cast-iron steam boilers are also used to a considerable extent, under high pressure, and so is cast-iron for large steam-pipes, and with no leakage through pores. It is also used almost everywhere for main water-pipes under very heavy pressures. In making contracts for such pipe it is usual to test each piece, before tarring the surface, with a pressure of *twenty atmospheres*, and to reject all pipes that show porosity. The very small number so rejected in the foundries of our large manufacturers at Camden and elsewhere shows that this porosity is the result of accident rather than the rule. In short, it has seemed to me of more importance in securing the impermeability of our stoves and furnaces to look after the *manner* rather than the *material* of their construction, provided the material be suited to the purpose generally and good of its kind. Those forms of furnaces which are made with a multitude of pieces, and having as many joints, are objectionable for this reason, namely, that whatever be the material, the repeated changes of form under varying temperatures will sooner or later work these joints loose. The furnaces illustrated on page 30, by Figures 140 and 143, are of this class. It is, of course, desirable to close the joints with cement. This soon becomes rigid, whatever its material, and yields to the changes of form that always occur during heating and cooling. Cracks without number are thus opened to act as breathing holes, and, whenever an outward pressure exists, to pollute the air of the house with the escaping gases. Even soapstone is open to this objection, though otherwise as good a material as can be found of equal conducting power. Wrought-iron is the only material that will resist the strain upon its joints, even when new. How long it will remain tight under such a repeated strain is the important question. When used for steam boilers and subjected to repeated heating and cooling, even through much less range of temperature than that to which heating furnaces are subjected, it soon works the joints loose and needs a deal of watching to keep them tight.

EDWARD S. PHILBRICK.

THE "QUEEN ANNE" STYLE.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — I wish to be enlightened concerning what is known as the "Queen Anne" style. As I understand it, this style is the outgrowth of an attempted union of certain classical or Renaissance features with the antagonistic Gothic, and it may be broadly defined as partaking in general of the latter style as regards *form*, and of the former as regards *detail*. I further understand that many of the characteristic features of the so-called style are modifications of those of the parent styles — due for the most part to influences of climate, and the complexity of requirements that modern buildings are subject to. I have a tolerably clear idea in my own mind as to what is meant by "Queen Anne," but I find that my idea does not coincide with that of many other presumably well-informed people. I find that buildings possessing widely varying characteristics — characteristics, too, which do not come under the above definition, and features which are Gothic if anything — are equally designated by the same term, "Queen Anne." I insist that a style worthy of the name must have some sort of definiteness, and in the absence of any known authority on the subject, I appeal to you for information.

As an instance of this indefiniteness permit me to call your attention to "The Craigs," Mr. Bruce Price, architect, which recently appeared in your journal. Here the form and ruling features, if anything, are purely Gothic or of Gothic origin. A few features of the design are, if anything, "Queen Anne." Is it fair to conclude that "The Craigs" is an example of this so-called style? Several architects have told me that it is; but I am not satisfied that the conclusion is a just one.

Can you throw any light upon this vexed question? F. A. W.

THE DUOMO AT FLORENCE.

NEW YORK, January 31, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

I beg to take issue with Mr. Jarves in regard to the completing (*sic*) front of Florence Duomo.

So far from its being "very satisfactory and extremely beautiful; a picturesque, brilliant, delicately sculptured front," it is, as you very justly described the first design, "bald, mechanical, and to most critics (and all artists) unsatisfactory."

It is only better than the usual Italian restorations in that it does not destroy existing work, and is so much worse than a restoration in that it has not the lines of the old design to fall back upon.

Very respectfully, STANFORD WHITE.

ANOTHER COMPETITION.

DENVER, COL., January 24, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir,— In order that the architectural brotherhood may not lose the opportunity which the inclosed "notice" will afford them to display their skill in designing, I should like to have you give the same a place in your valuable journal at the earliest opportunity.

If that as a text will enable you to give us a chapter, even a short one, that will throw light into this dark corner of the earth, upon what should be the fair and proper valuation of our profession by the people, it may cheer our drooping hopes and encourage us to still persevere in our efforts to do good to our fellow-men.

Yours respectfully, J.

NOTICE is hereby given that the Board of County Commissioners of Arrapahoe County will, on Monday, February 23, 1880, at 10 A. M., receive and examine plans and sketches for the proposed court-house in Denver. The sketches must include basement and floor plans, geometrical drawings of the different fronts, and a perspective view. Architects submitting plans must describe the building and give detailed estimate of cost; and must also state the price for which they will prepare complete working plans and specifications without superintendence. Full information can be obtained by application to the County Clerk. The Board reserves the right to reject any and all plans and sketches.

[We do not know that we have anything to add to what we have

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said before on this subject. The remedy lies with architects, so far as we can see. When they refuse, like our correspondent, to respond to such invitations, people will cease to issue them. Till then it will be difficult to prevent the mischief which the haunters of competitions do their profession, unless they can be shown to be inferior or untrustworthy practitioners. In respect to this we are reminded of a remark ascribed to a noted politician. "I don't say that everybody in the ——— party is a scallawag, but I do say that all the scallawags are in the ——— party." — Eds. American Architect.]

PUBLICATIONS RECEIVED.

Report of Proceedings of the Board of State House Commissioners for Quarter ending December 31, 1879, to the Governor of Indiana.

A Digest of Cases Relating to the Construction of Buildings, the Liability of Architects, Surveyors, and Builders, in Relation thereto, with Notes; and an Appendix of Forms of Pleadings, Building Agreements and Leases, and Conditions of Contracts. By Edward Stanley Roscoe, Barrister-at-Law, Honorary Associate of the Royal Institute of British Architects. London: Reeves & Turner. 1879.

NOTES AND CLIPPINGS.

The Hudson River Tunnel. — The *Engineering News* says that in consequence of certain newspaper reports of a sensational style going the rounds, it has obtained the following information regarding the progress thus far made in the construction of the Hudson River Tunnel, which is reliable. A shaft 30 feet in diameter has been sunk in Jersey City, 80 feet west of the Hudson River, to a depth of 55 feet below mean high water. A horizontal air lock has been placed in position, penetrating the side of the shaft, and the necessary machinery for compressing air has been provided and is now in good working order. To ascertain as early as possible the effect of the air on the mud, the experiment was tried of driving a heading from the shaft, instead of commencing the tunnel in an open cut. The opening was made 25 feet below high water, the roof consisting of mud 10 feet in depth, underlying loose ash filling 18 feet in depth, the size of the excavation being 15 feet by 6 feet by 4 feet, and the air pressure applied amounting to 12 pounds per square inch. This pressure was kept on four days, during which time no air escaped through the mud. At the end of the second day the surface of the mud which had been exposed to the air pressure became dry and began to crumble and crack open in places, and at the end of the fourth day these cracks had extended sufficiently through the mud to allow the air to commence to escape. Thereupon, the sides and roof of the opening began to give way, and twelve hours later the whole had fallen in. The loose filling above was then removed to a depth of 9 feet below high water, the bottom of the trench covered with canvas and timber, and the loose filling replaced. A new heading is now being driven in such a manner as not to allow any given surface of the mud to be exposed to air pressure for more than twenty-four hours.

The Right to Buried Statues. — The *Pall Mall Gazette*, in a recent issue, says: The Court of Appeal at Rome has just pronounced its decision in a case at once curious in its lf and notable for the position of the parties interested in it. These are her Majesty Donna Maria Cristina de Bourbon, Empress of Brazil, with her husband, his Majesty the Emperor of Brazil, and Donna Isabella, Countess d'Eu, Princess Imperial of Brazil, and the Count d'Eu, plaintiffs, against the Marchese Ferraioli, defendant. The subject of dispute is a property of the Bourbon family at Isola Farnese, near the ancient Veii, which the Ferraioli held in lease as from the Empress of Brazil. On this land was a charge, which by recent laws the tenant can claim to redeem, and thus acquire a right to the ground. The proprietors consented, but with the reservation that they could make excavations or claim any statues or antiques found on the property. This reservation was an important one; for several valuable discoveries have been made in the neighborhood, among others one of twenty-four Ionic columns; and the Ferraioli refused to admit its validity. In the mean while a bust of Antinous was found actually on the property — in fact, it was turned up by a plough; and the proprietors claimed it, while the Ferraioli refused to give it up. The Bourbons brought an action against their tenants for delivery of the bust, and the Ferraioli cited their landlords to fulfil the contract without conditions. The judgment pronounced was substantially in favor of the Bourbons; it being decided that the right of excavation constituted a value above the annual charge on the land, and that the bust was the property of the landlords, under the agreement.

Responsibility attaching to the Quebec Builder. — The *Northwestern Lumberman* says that according to the laws of the Province of Quebec, a builder is held responsible for the giving way of any portion of the structure he has erected, arising from any causes which he could have prevented, and this responsibility attaches to him for ten years after the edifice is completed. Not even if he shows that he followed the plans of the architect, and that the strength was all that was asked by those plans; not even if he protested against the sufficiency of the specifications by a legal and formal process; if he has reason to suspect a weakness of any part, and goes on with the building, he is for ten years held responsible for any consequences which may result. It seems hard, but we are not sure but that such a law would be beneficial in this country, and would result in giving us safer and better proportioned buildings, and prove a safeguard against a not infrequent class of accidents.

A Tree Housed. — A large elm tree stood on the spot where a man at Lewiston, N. Y., decided to build a residence He did not cut it down, but built around it. The odd sight is presented of a tree-top growing out of the roof of a handsome brick house. This, by the way, is a Japanese fashion.

Heavy Weather in Paris. — During the late heavy weather in Paris it was found necessary to close the galleries of the Louvre for a time, as the whole force of *gardiens* had to be employed in clearing from snow and ice the roofs and immense gallery lights.

The Kremlin at Moscow. — The Kremlin, the citadel of Moscow, is about two miles in circumference. It is walled all round, and is crowded with palaces, churches, monasteries, museums, towers and domes, steeples, arsenals, and public and private buildings, all representing modern European and Tartar architecture blended in the most appalling but picturesque confusion. It is entered by five gates, the most important of which are the "Redeemer's Gate" and the "St. Nicholas Gate," about which these stories are told. At the time of Napoleon's occupation of Moscow the Kremlin escaped destruction by the fire which swept away the whole city of palaces and hovels. Over the "Redeemer's Gate" hangs a picture of Christ, which Napoleon ordered to be taken down. Every ladder which was placed against the gate broke in two pieces. He gave orders to batter down the wall to secure the prize, but the powder would not ignite. A fire was built under the cannon, but it exploded at the breech and killed numberless artillerymen. Near the "St. Nicholas Gate" Napoleon's powder train exploded, completely destroying many fine buildings in the Kremlin and splitting the tower up to a few feet of the saint's picture, but not even cracking the glass which covered it. The Kremlin was a citadel, inclosed by walls of oak, as far back as history tells. In 1367 Demetrius, of the Don, replaced the wooden walls with stone, and in 1485 they were again rebuilt, very much as they are to-day. The Kremlin itself was destroyed by fire in 1737. The damage done by the French in 1812 has been repaired, and the place now contains some of the most picturesque architecture to be seen in Russia. — *Exchange.*

A Large Gas-Holder. — Messrs. Ashmore & White, of Stockton-on-Tees, England, have just secured the contract for the erection of what will be the largest gas-holder in the world. It has been designed by Mr. George Livesey, for the South Metropolitan Gas Company. It is of the kind known as treble lift. The inner vessel is 208 feet diameter by 53 feet 6 inches deep in the sides; the middle vessel is 211 feet diameter by 53 feet 3 inches deep; and the outer vessel 214 feet diameter by 53 feet deep. It will thus be seen that when full, the top curb of this holder will be approximately 160 feet high above the water tank line. The cubic capacity of the vessel will be 5,000,000 feet. The holder when at work will be retained in its position by means of 24 wrought-iron stanchions, constructed of plate, bar, and angle iron, tapering from 28 feet wide at the base to 22 feet at the top, and 165 feet high, or thereabouts. These are connected laterally by a series of strong horizontal struts or girders of + section, and by diagonal braces of flat iron, increasing in strength from the top downwards. What a contrast, says the *Engineer*, we have here between modern gas engineering and the time, within the memory of many men, when a London gas company kept a few thousand feet stored in balloons for their customers; while the Chartered Gas Company was once so hard up for a gas holder that it purchased a second hand brewer's vat and used it for that purpose.

Drainage of London Hospitals. — The authorities of one of the largest hospitals in London lately took measures to ventilate all the drains and sewers in connection with their institution. Up to the time these alterations were made pyæmia and erysipelas had almost driven the medical staff to despair. When the whole of the ventilation was completed, and as soon as the pressure was removed from the traps of the closets and lavatories, no fresh cases were found to occur. For months the hospital wards were free from both erysipelas and pyæmia. Suddenly, however, there was a fresh outbreak of these diseases, but it was noticed that the epidemic was confined to one of the surgical wards, built apart from the main building, on the pavilion plan, and having only one story. Close investigation proved that the ventilation pipe in this wing had been stopped up by a careless workman. When this was remedied all traces of the epidemic disappeared.

The Fairmount Park Washington Monument. — A monument to Washington, to cost $200,000, and designed by Professor Siemering of Berlin, is to be erected in Fairmount Park, Philadelphia. Only $45,000 of the sum remains to be subscribed.

Jersey City Schools. — A number of the Jersey City public school buildings are pronounced unsafe by City Architect Broome. The main defects are small and crooked wooden staircases, rotten floor-beams, and bad ventilation.

Michelet's Monument. — M. Mercié, sculptor of the Gloria Victis, and M. Pascal, architect to the National Library and one of the sculptors of the memorial to Henri Regnault at the École des Beaux-Arts, are engaged on Michelet's tomb. The monument consists of three marble steps, superposed so as to receive vases of flowers, two handsome columns rising in the centre and supporting a light architectural coronation, and enclosing a marble slab on which the figure of Michelet appears in high relief. He is seen in a recumbent position, and before him stands a symbolical statue of Truth, writing at his dictation. In front of the group is a fountain surrounded right and left by plants.

The Belfort Lion. — The lion of Belfort is not carved out of the stone, like that at Lucerne, but is supported, in relief, on a platform constructed for the purpose against the rock. Its material is the mineral known as Vosges sandstone, whose reddish tint seems less adapted for works of sculpture than the white color of the Jurassic limestone; the blocks of which it is composed are put together and united by cement and this mode of adjustment has necessarily greatly augmented the difficulty of the task.

The New Brunswick Legislative Buildings. — The prizes for plans for new legislative buildings at Fredericton, N. B., have been awarded as follows: 1st prize ($500), J. C. Dumaresque, St. John; 2d ($300), McKean & Fairweather, St. John; 3d ($100), Brown & Allison, St. John.

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BUILDING INTELLIGENCE.

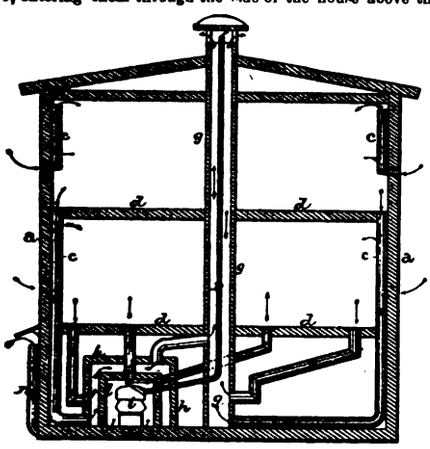
[Reported for the American Architect and Building News.

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

225,006. HOUSE VENTILATION. — Thomas B. Pierson and Oswald J. Burnett, Morristown, N. J. The invention consists in supplying each room with fresh air through the side of the building, discharging it into the room at or near the ceiling, taking off the foul air at the floor, and connecting the pipes which carry off the foul air with a central shaft, through which flows an upward current. *a* represents a building, the rooms of which have a fresh-air pipe, *c*, entering them through the side of the house above the



floors *d*. The upper ends of these pipes are near the ceiling, so as to discharge the fresh air into the top of the room, and are covered with a wire-gauze, so as to prevent a draught through the room. In the pipes *c* are placed valves, near their lower ends, so that the amount of air can be controlled. Leading from the floor of each room is a foul-air pipe, *e*, which has its lower end connected either with the shaft *g* or an outer jacket, *h*, surrounding the furnace *i*. This furnace is inclosed in the usual jacket *l*. Fresh air is supplied to it through the pipe *n*, from the outside of the building, and after it is heated it passes to the different rooms through the hot-air pipes *o*. The products of combustion from the furnace pass off through the smoke-pipe *r*, which extends up through the centre of the shaft, so as to heat the air in the shaft and cause an upward current, the object being to cause an upward draught, and form a partial vacuum in the lower part of the shaft, so as to suck the foul air from the foul-air pipes. The air in the outer jacket, *h*, becomes heated by contact with the inner jacket, *l*, and thus an upward draught is started through it toward the shaft, and this draught causes suction enough to draw the foul air from the rooms above. Thus, while the furnace draws the foul air from the rooms above on one side, the shaft draws it down from the rooms on the other side of the house.

223,796. WEATHER STRIP. — William J. Anderson, Hillsdale, Io.

223,802. SHEAVE. — Ellis D. Draper, Norwood, Mass.

223,815. MANUFACTURE OF CEMENT AND ARTIFICIAL STONE. — Frederick Ransome, Lower Norwood, England.

223,819. MITERING MACHINE. — Theodor Schreppel, San Francisco, Cal.

223,826. FLUSH-TANK. — George E. Waring, Jr., Newport, R. I.

223,835. PIPE-COUPLING. — David Boyle, Chicago, Ill.

223,836. KEY-HOLE GUARD. — Franz Canis, Hamburg, Germany.

223,840. TUBE-EXPANDER. — Henry H. Collins, Pittsburgh, Penn.

223,849. SOLDERING-IRON. — John J. Henry, Baltimore, Md.

223,851. WOOD-PLANING MACHINE. — Lucius P. Hoyt, Aurora, Ill.

223,861. STOVE. — Albert J. Redway, Avondale, O.

223,869. CRAYON COMPOUND. — Nathan Ullman and Mark D. Stiles, New York, N. Y.

223,878. CURTAIN-FIXTURE. — Malachi Brown, East Saginaw, Mich.

223,888. ROCK-DRILL. — John J. Cranston, Newcastle-upon-Tyne, England

223,893. EXTENSION CHANDELIER. — Charles Deaves, New York, N. Y.

223,905. DISTEMPER PAINT. — Christopher G. Dodge, Jr., New York, N. Y.

223,911. WATER-HEATER. — William R. Hindale, Garden City, N. Y.

223,925. COMPRESSED-AIR WATER-ELEVATOR. — Thomas B. Keating and Lafe W. Clarke.

223,937. HINGE FOR AWNING-BLINDS. — Tom O. Memery, Key West, Fla.

223,941. DOOR-HANGER. — Alexander M. Monteer, Kansas City, Mo.

223,942. LUMBER-TRIMMING MACHINE. — Peter Musser, Muscatine, Io.

223,945. SOLDERING-TOOL. — Delos Palmer, Chicago, Ill.

223,951. HOT-WATER RESERVOIR. — Delos E. Rice, Detroit, Mich.

223,964. BAND SAWING MACHINE. — Garritt M. Van Riper, Bodie, Cal.

9,057. PILE-DRIVER. — (*Reissue.*) Jacob Huy, Whistler, Ala.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since our last report: —

Mrs. R. W. Armstrong, three-st'y brick building, 128 Lexington St., near Park St.

Mrs. E. Harwood, three-st'y brick building, 126 Lexington St.

Messrs. Becker & Bros., three-st'y brick building on Frederick St., bet Fayette and Gay Sts.

Mrs. Mary Summers, three-st'y brick building, 142 and 144 Camden St.

Mrs. Catherine Eppler, warehouse on Conway St.

Mr. C. Bernhardt, two-st'y brick building, 272 Cross St.

Mr. Wm. Roberts, two-st'y brick building, 125 Lexington St.

WAREHOUSES. — Messrs. Wm. T. Markland & Bro. (builders) are building a large fire-proof warehouse on the corner of Baltimore and Howard Streets, for Henry White Esq., 30 feet front on Baltimore Street and 172 feet on Howard Street, five stories high, running back to German Street, to cost $60,000; Messrs. Dixon & Carson, architects.

Mr. C. E. Cassell, architect, is preparing drawings for two new warehouses for T. M. Gaither, Esq., 46 by 120 feet, six stories high, iron fronts; will cost $25,000; to be built on Baltimore Street, near Hanover Street.

Messrs. Hamberger Bros., Benj. Burgender, Louis Rosenberg, William T. Dixon & Bro., and Francis White are putting up five very large warehouses on Sharp Street, near Lombard Street, covering a space 125 feet front by 198 feet deep, five stories high, iron fronts, cost $125 000; Dixon & Carson, architects.

U. S. MARINE HOSPITAL. — Dr. Chas. B. Goldsborough, of the United States Marine Hospital Service, called on Mayor Latrobe, Thursday, January 29, and requested him to sign a petition to Congress asking for the establishment of a United States Marine Hospital at Baltimore. The proposed hospital will cost $150,000.

Boston.

BUILDING PERMITS. — Since our last report the building permits granted are as follows: —

Brick. — 82 *Middlesex St.*, Ward 16, for B. J. Connolley, 1 dwell., 27′ x 42′; three stories; T. Connolley, builder.

Wood. — *Clay Ave.*, Ward 24, 1 stable, 24′ x 33′; F. P. Nichols, builder and owner.

Milton Ave., Ward 24, for Devereaux & Meserve, 1 stable, 20′ x 26′; J. B. & J. W. Keene, builders.

PUBLIC LIBRARY. — The Committee on Public Library has voted to report an order authorizing the mayor to petition the Legislature to set apart a section of land owned by the Commonwealth in the vicinity of the Old South Church, on which a public library for the city of Boston is to be erected. It is not proposed to take measures, if the request is granted, for the immediate erection of a new building, but to obtain possession of land which can be used when a new building is absolutely required.

Brooklyn.

BUILDING PERMITS. — *Montrose Ave.*, 1 two-st'y frame factory, 30′ x 25′; owner, Barbara Grunfelder, 237 Montrose Ave.; builder, Bernard Grunfelder.

Eighteenth St., 1 two-st'y frame dwell., 18′ 9″ x 34′; owner, John Mahony, 118 Twelfth St.

Bushwick Boulevard, cor. Johnson Ave., 1 three-st'y frame dwell, 25′ x 52′; owner, M. Levy; architect, H. Engelhardt; builder, Michael Metzen

Nostrand Ave., 5 two-st'y frame dwells., 17′ 10″ x 42′ 6″; owner, F. J. Buchenberger, 95 Pulaski St.; architect, A. W. Dickie.

Bond St., cor. Third St., 1 one-st'y frame box factory, 35′ x 90′; owner, R. W. Adams; builder, Peter Donalan.

Thirty ninth St., 2 two-st'y frame dwells., 20′ x 35′; owners, Stafford & Doyle; masons, Fitzgerald & Sullivan; carpenter, H. Stafford.

GOVERNMENT BUILDING. — A unanimous report has been made to the House of Representatives by the Committee on Public Buildings and Grounds, in favor of Mr. Bliss's bill, appropriating $60,000 for the erection of a government building in this city. This has been indorsed by the Secretary of the Treasury and the Supervising Architect.

Buffalo.

HOTEL. — It is reported that a new hotel of magnificent proportions is to be built by a stock company on Exchange Street, on the land east of the Washington Block. It is proposed to extend Ellicott Street through from Seneca Street to Exchange.

HOUSES. — Mr. M. E. Beebe, architect, is building three houses on Delaware Avenue, at an average cost of $15,000 each; a house on the same avenue for Mr. Wilson Howard, cost $20,000; and several others.

Messrs. Holmes & Little, architects, are to build, for Mr. H. P. French, a house on Delaware Avenue, which will cost $7,000.

Mr. George J. Metzger, architect, is preparing drawings for a house for Mr. J. B. Schoellkopf, on Delaware Avenue; cost, about $35,000.

STORES. — Mr. F. W. Caulkins, architect, is to build a large building on Main Street, north of Swan, at a cost of $85,000.

Dr White intends to build a large block of stores at the corner of Erie and Main Streets, from designs by Messrs. Rumrill & Rupp, architects.

Chicago.

BUILDING PERMITS. — *Fairfield Ave., No.* 94, two-st'y dwell., for F. Trapp; cost, $2,500.

Eighteenth St., two-st'y dwell., for M. Tapa; cost, $2,000.

West Water St., Nos. 10 *and* 12, elevator, for N. E. Platt; cost, $8,500.

Belden Ave, cor. of Hurlburt, two-st'y dwell., for J. R. Lilja; cost, $5,000.

Halsted and F Sts., two-st'y store and dwell., for P. McGillen; cost, $3,500

Monroe St., two-st'y dwell., for Dr. A. B. Strong; cost, $4,000.

Carpenter St., two-st'y store and dwell., for V. Kopetsky; cost, $2,200.

Larrabee and Hawthorne Sts., two-st'y warehouse, for H. H. Shufeldt & Co.; cost, $5,000.

Milwaukee Ave., Nos. 350 *and* 352, three-st'y store and warehouse, for H. Horman; cost, $8,500.

Milwaukee Ave., Nos. 354 *and* 356, three-st'y store and dwell., for M. Mitchell; cost, $9,000.

Dearborn Ave., No. 187, two-st'y dwell., for N. M. Freer; cost, $6,000.

Thirtieth St., No. 169, two-st'y dwell., for John Covert, cost, $3,000.

Charles St., one-st'y freight-house, for the Chicago & Alton Railroad Company, 340′ x 28′; cost, $8 000.

Huron St., No. 221, three-st'y dwell., for D. Danielson; cost, $5,000.

Hinman and Loomis Sts., one-st'y dry-kiln, for Soper & Pond; cost, $7 000.

Sigel St., No. 104, two-st'y dwell., for John Matthews; cost $2,800.

Indiana Ave., two-st'y dwell., for Dr. Hale; cost, $4,000.

Twenty-sixth St., near Stewart Ave., two-st'y factory, for J. Q. Wells; cost, $2,000.

Lyon Place, near Throop, two-st'y dwell., for Joseph Kleina; cost, $2,200.

SCHOOL-HOUSES. — The Building Committee of the School Board has been authorized to build schools opposite Wicker Park and on the corner of Douglas and Waller Streets, and to advertise for a site east of Halsted Street and south of Archer Avenue.

Cincinnati.

DEPOT. — The Little Miami and Louisville Short Line Railroad Companies will unite in building a huge new passenger depot at the southeast corner of Pearl and Butler Streets. It is understood that work upon the structure will begin at once.

Indianapolis.

CITY-HALL. — The City Council, at its last meeting, appropriated $200 to advertise for plans for a new city-hall.

LIBRARY. — The Library Committee is still considering the propositions submitted by various capitalists as to furnishing a building site for the new city library.

FREIGHT-HOUSE. — The I., D. & S. R. R., the twelfth road running to the Indianapolis Union Depot, will soon begin to build a large freight-house. A number of new stations along the line will be built also.

STORES. — Mr. R. P. Daggett, architect, is building a block of stores for Mr. Robinson, at a cost of $15,000.

New York.

BUILDING PERMITS. — *One Hundred and Twenty-seventh St.*, 6 three-st'y brick (brown-stone front) dwells., 16′ 8″ x 50′; cost, each, $6,500; owner, S. Stevens, 21 Beekman Place; architect, Wm. José.

Allen St., No. 85, 1 three-st'y brick tenement, with stores on first floor, 25′ x 54′; cost, $6,000; owner, Estate of Mrs. Maria C. Cadwallader; architect, Julius Boekell.

Third Ave., No. 1020, 1 five-st'y brick tenement, with store on first floor, 25′ x 68′; cost, $12,000; owner, Wm. Ahlborn, 1015 Third Ave.; architect, Julius Boekell.

Sixty-eighth St., cor. Park Ave., 1 four-st'y brick dwell., 36′ x 67′; cost, $40,000; owner, A. H. Stevens, 14 East Twenty-ninth St; architect, George E. Harney; mason, John J. Tucker; carpenter, Bartlett Smith.

Seventh St., Nos. 25 *and* 27, 2 five-st'y brick tenements, 26′ x 65′; cost, each, $11,000; owner, Z. W. Miller, 41 Seventh St.; architect, Johst Hoffman.

Tenth St., No. 103 *E.*, 1 five-st'y brick (brown-stone front) apartment-house, 32′ x 84′ 6″; cost, $18 000; owners, Dugro & Raegener. Staats Zeitung Building, Tryon Row; architect, F. W. Klemt.

One Hundred and Sixteenth St., Nos. 206 *and* 208 *E.*, 2 three-st'y brick (brown-stone front) dwells.; cost, each, $15,000; owner, Thomas F. Treacy, One Hundred and Thirty-fifth St. and Sixth Ave.; architect, Charles W. Romeyn; mason, James A. Frame; carpenter, Samuel Wright.

Seventy ninth St, No. 243 *E.*, 1 four-st'y and basement brick (brown-stone front) dwell., 11′ 8″ x 26′; cost, $5,000; owner, A. M. Heins; architect, J. D. Heins.

Thirty-first St., Nos. 128 *and* 130 *W.*, 1 two-st'y (brick and iron front) building (hotel and music-hall), 50 feet front and 131′ 8½″ and 142′ 2½″ deep; cost, $20,000; owner, D. McQuien, 23 West Fourteenth St.; architect, Wm. E. Townley, Jr.; builder, D. McQuien.

Fifty-second St., Nos. 342 *and* 344 *E.*, 2 five-st'y brick (brown-stone front) flats, each 20′ x 64′; cost, $12,000; owner, Dennis Loonie, 175 East Seventieth St.

Fifty-second St., No. 346 *E.*, 1 five-st'y brick (brown-stone front) flat, 30′ x 64′ 8″; cost, $16,000; owner, Dennis Loonie, 175 East Seventieth St.

Eleventh Ave., 1 four-st'y brick store, 24′ 8″ x 65′; cost, $6,000; owner, John McClave.

Jane St., cor. Thirteenth Ave., 1 four-st'y brick factory, 70′ 5″ x 80′; cost, $7,000; owners, Mallon & Rourke, cor. Jane St. and Thirteenth Ave.; architect, George J. Carey.

Eighty-first St., 2 four-st'y brick (brown-stone front) apartment-houses, 21′ 5″ x 62′; cost, each, $12,000; owner, Otto W. Loeffler, 113 East Seventy-seventh St.; architect, John C. Burne; mason, James A. Frame, 107 East Seventieth St.

Eighty-fifth St., 1 four-st'y brick (brown-stone front) apartment-house, 25′ x 64′; cost, $12,500; owner, Otto W. Loeffler; architect, John C. Burne; mason, James A. Frame.

One Hundred and Third St, cor. Lexington Ave., 1 four-st'y brick (brown-stone front) apartment house, with store on first floor, 25′ 11″ x 62′; cost, $14,000; owners, Christy & Walker, 101 East One Hundred and Fifth St.; architect, John C. Burne.

Lexington Ave., cor. One Hundred and Fourth St., 1 four-st'y brick (brown-stone front) apartment-house, with store on first floor, 25′ 11″ x 62′; cost, $13,500; owners, Christy & Walker; architect, John C Burne.

Eighty-ninth St., 1 five-st'y brick tenement, 25′ x 55′; cost, $11,000; owner and builder, Morris R. Williams, 602 East Fifteenth St.; architect, Charles Wright.

One Hundred and Seventeenth St., 4 four-st'y brick apartment-houses, 18′ 9″ x 59′; cost, each, $6,000; owner, Maria J. Moore, 311 East One Hundred and Thirteenth St.; builder, Hiram Moore.

ALTERATIONS. — *Third Ave., No.* 354, four-st'y brick building, an additional story to be built, new store front and internal alterations; cost, $25,000; owner, John Jacob Astor; architect, Thomas Stent; mason, Marc Eidlitz; carpenter, John Downey.

Twenty-sixth St., No. 158, two-st'y brick building, to have three stories added and internal alterations; cost, $20,000; owner, John Jacob Astor; architect, Thomas Stent; mason, Marc Eidlitz; carpenter, John Downey.

Water St., Nos. 506½ *and* 508, 2 three-st'y and attic brick stores and dwells., new fronts to be built and internal alterations; cost, $1,000; owner, Wm. Brasch, 506 Water St.; mason, Henry Hollwedel; carpenter, L. Antonius.

Broadway, No. 386, five-st'y brick store and offices, damage by fire to be repaired: cost, $19,500; owner, Robert W. Tailer, 12 East Tenth St.; builders, Moore & Wilson.

Fulton St., cor. of Washington St., four-st'y brick store, new front built and first floor lowered; cost, $1,575; owner, H. & J. Blendeman, cor. Liberty and West Sts.; builder, J. E. Walker.

Second Ave., Nos. 1654 *and* 1656, 2 four-st'y brick tenements, four-st'y brick extension, 7′ 8″ x 9′; cost, $2,500; owner, Henry Hines, No. 1658 Second Ave.; architect, John Cook, 413 East Eleventh St.; builders, Cook & Higgins.

Waverly Place, cor. Greene St., three-st'y brick manufactory, to have a fourth story added: cost, $2 000; owner, Cyrus Clark, Riverside Ave.; architect, John B. Snook.

Fulton St., cor. Dutch, four-st'y brick store and workshop, a fourth story to be added: cost, $3,000; agents, E. A. Cruikshank & Co., 68 Broadway; architect, Henry Dudley; builder, Seth W. Howard.

Chambers St., No. 25, 1 five-st'y brick office building and dwell., two additional stories to be built; cost, $1 ,000; owner, Myer Finn, 339 Broadway; architect, J. F. Duckworth.

Twenty-fourth St., No. 6 *W.*, two-st'y brick building, new front to be built and interior to be fitted up for box office of theatre; cost, $2,500; owner, Phillips Phœnix; architects, Kimball & Wheedell; mason, Richard Deeves; carpenters, Smith & Crane.

Eighty-seventh St., three-st'y frame dwell., a two-st'y brick extension, 16′ 8″ x 12′, to be built on rear; cost,

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$1,200; owner, J. K. Dalton, 162 East Eighty-seventh St.; builder, B. Oakley.

The buildings 37 and 39 West Sixteenth Street are to be altered into flats from designs of Mr. Jos. M. Dunn.

Nos. 25 and 27 Seventh Street are to be remodelled as an apartment-house, by direction of Mr. J. W. Miller. Mr. J. Hofferman is the architect.

ASYLUM. — The Hebrew order of the B'nai Brith is considering the question of building an asylum at Yonkers capable of receiving one hundred and fifty aged and infirm Hebrews. The B'nai Brith proposes to use about $70,000 out of its building fund of $100,000 for this purpose.

CHURCH. — Seventy thousand dollars were lately subscribed at one meeting of the Madison Avenue Baptist Church, for the purpose of building a new church on Madison Avenue.

FACTORY. — A factory is to be built for Mr. Jno. McClave, 65 by 25 feet, four stories high, on Twenty-second Street and North River. The building will be of brick. Mr. Wm. B. Pettit is the builder.

FULTON MARKET. — The Sinking Fund Commissioners have postponed action, and it still remains doubtful as to whether the market will be rebuilt.

LIBRARY. — The building of the new Mercantile Library is liable to be postponed somewhat, as the old lease has not yet been disposed of.

STORE. — A store, Trenton brick face, six stories high, is to be built at 364 and 366 Broadway, for Geo. E. Ward and Mrs. Mary Bradhurst. Designs have been drawn by Mr. S. D. Hatch.

THE PRESENT SEASON. — Since the 1st of January a marked increase in the applications for building permits is noticed. One hundred and twenty-one new applications have been received by the Department of Buildings since the first of the year, the aggregate of which amounts to $846,100. Among the most important applications filed are those for a large building on the southwest corner of Broadway and Forty-first Street, the cost of which is to be $85,000, and a first-class store on Broadway, for Ward & Bradhurst, at a cost of $75,000.

Philadelphia.

MONTHLY REPORT. — During the month of January 101 building permits were issued by the building Inspectors, Messrs. Hancock, Zimmerman, and Bowen. The following statement will indicate the number and character of the buildings for which the permits were issued: —

Additions and alterations, 39; dwellings, two-story, 16; three-story, 6; stores and dwellings, two-story, 2; three-story, 3; back buildings, 6; stables, 9; kitchens, 4; factories, 3; shops, 2; slaughter-houses, 2; wash-house, 1; brewery, 1; shed, 1; office, 1; store, 1. boiler-house, 1; bath, 1; store-house, 1; and dye-house, 1; total, 101.

ALTERATION. — The building of Townsend, Whelen & Co. is being remodelled with a brown-stone front to the second story, and a two-story back building, 22 by 65 feet: cost, $8,000; Geo. W. Hewitt, architect; James Errickson, builder.

HOUSES. — Two stone houses, with plaster panels and timber structures, are now building for Jos. Patterson, at Chestnut Hill; cost, about $14,000; Mr. James Sims, architect.

At the same place Mr. Sims is remodelling the houses of Messrs. Clayson and Townsend; cost, $5,000.

OFFICE BUILDING. — Competitive designs are now being made for a large building for the Union Insurance Company, at the corner of Third and Walnut Streets. This building will be 50 by 78 feet, brick and marble, four stories high. The cost, with the ground, will be about $115,000.

STABLE. — Mr. G. G. Way is building, on Eighteenth, below Fairmount Avenue, a large brick stable, 102 by 104 feet, three stories in height; cost, from $15,000 to $18,000.

THE PUBLIC BUILDING. — Several parts of this building are now open as public offices. From the late appropriation of $665,000 the heating apparatus is being perfected and the stone-cutting carried on. Specifications are now being made for the work to be carried on in the coming spring.

St. Louis.

BUILDING PERMITS. — Fifty-four permits have been issued since our last report, of which sixteen are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows: —

Owners.	Use.	Stories.	Rooms.	Cost.
John Kimple.	Carriage Factory.	3	7	$7,000
L. Jones.	Dwelling.	3	10	5,000
Charles Fink.	Turf Exchange.	3	10	5,000
Dr. N. Gohman.	Dwelling.	2	12	3,800
J. S. Gray.	Dwelling.	2	12	3,800
St. Louis Mutual Building Co. No. 3	Dwellings.	4	33	14,000
J. Morrisy.	Dwelling.	2	14	7,000
W. S. Balson.	Dwelling.	2	18	3,000
F. Knotthamper.	Dwelling.	2	8	2,500
Bukmeyer & Beckman.	Dwelling.	2	16	3,000
L. Fuaz.	Dwelling.	2	11	10,000
A. Steinwender.	Dwelling.	2	10	5,700

St. Paul, Minn.

STORES. — Dr. Wharton will erect a building for Strong, Hackett & Chapin, on Fourth Street, which is to be four stories high, and 50 by 125 feet. The excavation is now in progress.

Lindeke, Warner & Schurmeier will build a large wholesale dry goods house — probably on the corner of Third and Wacouta Streets.

Mr. John Wann proposes to build several large buildings on his grounds for wholesale trade.

Mr. George Mitsch will build on the northwest corner of Seventh and St. Peter Streets.

Mr Pfeiffer will build a block adjoining the market-house.

Dr. John Steele will put a block of stores up on the corner of Seventh and Wabasha Streets.

Mr. Sherman will put up a block on the corner of Ninth and Wabasha Streets.

General Notes.

BANGOR, ME. — Bangor is to have a new opera-house. Mr. Eugene M. Hersey has the matter in hand.

BATON ROUGE, LA. — Mr. Robertson's House Bill, providing for building a post-office and revenue offices, has been referred to the Committee on Public Buildings and Grounds.

BEATRICE, NEB — New elevators, to hold 25,000 bushels, are building here.

BERLIN, ONT. — D. W. Gingrich, of Waterloo, is the architect of the three-story store which is to be built for Mays Breighaupt. It will measure 60 by 80 feet.

BIDDEFORD POOL, ME. — Arthur Starkweather is building a hotel, having a frontage of 195 feet, and two wings each 165 feet long and 34 feet wide. It will be four stories high, with a mansard roof. The house will be completed in season for the summer business.

BRATTLEBORO, VT. — The Methodists have finally purchased the Starr & Estey lot on Elliott Street, and hope to build a handsome brick church the present year. A. C. Davenport, Rev. D. E Miller, J. C. Howe, W. R. Geddes, and A. V. May have been chosen a building committee.

BRYN MAWR, PENN. — Willis G. Hale, architect, Philadelphia, has drawn plans for a house for Henry Whelen. The house will be 61 by 67 feet, gray stone with brick trimmings, three stories in height; cost, $12,000; Sam. K. Bye, builder.

BURLINGTON, N. J. — Geo. W. Hewitt, architect, of Philadelphia, has drawn plans for the Burlington Savings Institute. It will be of brick and granite, 52 by 65 feet, three stories in height; cost, $12,000.

CLARKSBURGH, W. VA. — The governor and others have petitioned the general government for an appropriation to build a public building here.

DANVILLE, VA. — $65,000 will probably be appropriated for a public building in this city.

DAYTON, O. — The new brick paint shop at the car works is progressing rapidly. It is a brick building, 150 by 60 feet, and three stories high.

DENVER, COL. — Mr. Hill's Senate Bill to provide for building has been referred to the Committee on Public Buildings and Grounds.

Mr. Emmet Anthony, architect, reports the following: —

Block of small two-story stores for Dr. W. R. Whitehead; cost, $7,000.

Block of four two-story houses and one store for Atwell Rennick, Esq.; cost, $15,000.

House for Mr. J. B. Vroom; cost, $6,000.

FORT BENTON, MONT. T. — A church is to be built here.

GALVESTON, TEX. — The Committee on Public Buildings and Grounds has before it Mr. Jones's bill for building a custom-house in this city.

GEORGETOWN, COL. — The Cushman Opera-House has been indicted by the grand jury as an unsafe building.

GRAND RAPIDS, MICH. — D. I. Hopkins, architect, has work as follows: —

Dwelling for Don Leathers; cost, $1,500

Dwelling for Milan Hibbard; cost, $3,500.

Dwelling for C. M. Loomis; cost, $2,000.

Business looks bright for the coming season in all branches of business.

GREENVILLE, S. C. — The Committee on Public Buildings and Grounds is considering Mr. Erving's bill for building a post-office.

JOLIET, ILL — The Charities Committee of the Board of Supervisors has accepted plans and specifications for a new poor-house, which is to cost $4,800. H. Boehme is the architect.

KNIGHTSTOWN, IND. — There is talk of building the much-needed new depot.

LA CROSSE, WIS. — The Committee on Public Buildings and Grounds is considering the question of a public building for this city.

LEBANON, O. — Mr. Beirs, architect, is to alter the old court-house.

LITTLE ROCK, ARK. — The Committee on Appropriations has before it Mr. Craven's House Bill for continuing the construction of the court-house and post-office.

LOUISVILLE, KY. — Mr. Willis's bill to provide for the erection of a public building in this city is before the Committee on Public Buildings and Grounds.

LOWELL, MASS. — The Middlesex Manufacturing Company is to build a main mill five stories high, 175 by 55 feet, and running at right angles with the same a wing of two stories, having a floor 80 by 55 feet.

MANISTEE, MICH. — W J Lawton has broken ground for the erection, on River Street, east of the bridge, of a two-story brick building, 30 by 60 feet.

MILWAUKEE, WIS. — There are rumors of glass works that are to be built outside the city limits, on the South Side, with a capital of $300,000.

MINNEAPOLIS, MINN. — A new church is to be built here, of a very handsome brown sandstone from the region of Duluth.

MONSON, MASS. — A new Baptist church is talked of.

NEW RICHMOND, O. — A new building is to replace the old Peyden House.

NEWPORT, R. I. — The plans for the new engine-house for No. 2 company, on Bridge Street, have been prepared, and the special committee has decided to recommend those drawn by Mr. Dudley Newton.

The house for F. B. Porter, Esq., on Bellevue Avenue, Messrs. Potter & Robertson, of New York, architects, an illustration of which was published in our issue of January 24, is to cost about $18,000.

OAKDALE, NEB. — A move is on foot to build a Methodist church here.

OAKLAND, CAL. — The corner-stone of a Masonic Temple was laid Saturday, January 10. The new temple, it is represented, will cost about $60,000.

OLD ORCHARD, ME — A mammoth hotel is to be built at Old Orchard Beach. The work on it will shortly be commenced.

PITTSBURGH, PENN. — J. T. & A. H. Hamilton are building a glass factory at the corner of Twenty-sixth Street and A. V. R. R. The main building will be sixty-five feet square.

RACINE, WIS. — The work of rebuilding the Mitchell, Lewis & Co. wagon works is rapidly progressing.

RADNOR, PENN. — A new school-house will be built near Tyron Lewis's mills, next spring.

ROCHESTER, N. Y. — The House Committee on Public Buildings and Grounds has reported favorably on a bill to appropriate $300,000 for a public building in this city.

SAN FRANCISCO, CAL. — Mr. Davis's bill to provide for the building of a post-office building has been referred to the Committee on Public Buildings and Grounds.

SOQUEL, CAL. — A new paper-mill is being built here.

SYRACUSE, N. Y. — Mr. Hiscock's House Bill to secure an appropriation for building a United States court-house and revenue offices has been referred to the Committee on Public Buildings and Grounds.

TARRYTOWN, N. Y. — Messrs. Lambe & Wheeler, of New York, are the architects of a house to be built for Mr. Brown, of stone, with brick finish in old Colonial style; gables with frame-work; cost, about $25,000.

TOLEDO, O. — The bill appropriating $250,000 for a public building in this city has been approved by the House Committee on Public Buildings and Grounds.

TOPEKA, KAN. — Sells Brothers have bought lots here, on which they will build an opera-house to cost $30,000.

WASHINGTON, CONN. — Messrs. Potter & Robertson, of New York, are the architects for the house now building for Mr. Vaningen. It is a frame dwelling, and will cost about $15,000.

WATERLOO, ONT. — The Ontario Mutual Life Assurance is building a three-story brick and stone office building from the designs of D. W. Gingrich, architect; cost, $7,000.

Bids and Contracts.

AURORA, IND. — The bids for building our new school-house have been opened. The amounts ranged from $23,500 to $28,000. Frank Trester, of Chicago, had the lowest bid.

AVONDALE, O. — Messrs. Kemme & Rosentiel, of Cincinnati, are the contractors for the large new house to be built on the Reading Road, near Avondale.

LOCK HAVEN, PENN. — Messrs. Kreamer & Mann have closed a contract to manufacture 6,000,000 feet of yellow and white pine boards by the 1st of August.

WASHINGTON, D. C. — The contract for building the new school-house on Massachusetts Avenue, according to the revised plan, has been awarded to Mr. John H. Hewett, for $34,396.

INDEX OF CURRENT WORK,

Giving information concerning important buildings now unfinished.

[Architects and Builders are requested to aid the editors in making the information in this department full and exact. Notice of the completion of a building is particularly desired.]

Baltimore.

RAILROAD OFFICE — Office for Baltimore & Ohio R. R. E. F. Baldwin, architect. Cost, $400,000. 214 x

Boston.

STORES. — Liberty Building. W. G. Preston, architect. Cost, $200,000.

Brooklyn.

HOSPITAL. — Eastern District Dispensary and Hospital. C C. Buck, architect. Cost, $35,000. 204 y

HOSPITAL. — Hospital of St. Mary. Mr. P. C. Keely, architect. Cost, $200,000.

Chicago.

HOTEL. — Hotel. T. V. Wadskier, architect. Cost, $30,000. 215 x

ASYLUM. — Home for the Aged. Cost, $25,000.

New York.

STORE. — Store for Arnold, Constable & Co. W. Schickel, architect. Cost, $200,000. 210 x

BARGE OFFICE. — Mr. J. G. Hill, Supervising Architect. Cost, $146,000.

CHURCH. — St. Paul's (R. C.). Mr. J. O'Rourke, architect, Newark, N. J. Cost, $500,000.

OFFICE BUILDING. — G. E. Harney, architect. Cost, $200,000.

COLLEGE. — Addition to Columbia College. C. C. Haight, architect. Cost, $200,000.

DWELLINGS. — House for Cornelius Vanderbilt. G. B. Post, architect. Cost, $250,000. — Houses for W. H. Vanderbilt. J. B. Snook and C. B. Atwood, architects. Cost, $400,000 and $300,000.

CLUB-HOUSE. — Union League Club-House. Messrs. Peabody & Stearns, architects, Boston. Cost, $250,000.

WAREHOUSE. — Building for Robbins & Appleton. S. D. Hatch, architect. Cost, $120,000.

APARTMENT-HOUSES. — "The Benedict." McKim, Mead & Bigelow, architects. Cost, $90,000. — Apartment-House. J. W. Pirsson, architect. Cost, $85,000.

TENEMENT-HOUSE — Potter & Robertson, architects. Cost, $50,000.

ASYLUM — St. Vincent's Home for Boys. L. J. O'Connor, architect. Cost, $111,500.

MASONIC TEMPLE. — Thom & Wilson, architects.

IRON STORE. — Edward D. Harris, architect. Cost, $60,000.

OFFICE BUILDING. — Smith Building. G. B. Post, architect. Cost, $150,000.

STORE. — J. Correja, architect. Cost, $300,000.

Philadelphia.

PUBLIC BUILDINGS. — Mr. J. McArthur, Jr., architect.

CONVENT. — Convent of the Good Shepherd. J. J. Deery, architect. Cost, $110,000. 215 x

Providence, R. I.

CATHEDRAL. — Mr. P. C. Keely, architect, Brooklyn. Cost, $350,000.

St. John, N. B.

CHURCH. — Trinity Church. W. T. Thomas, architect, Montreal. Cost, $65,000.

St. Louis.

CUSTOM HOUSE AND POST OFFICE. — Mr. Jas. G. Hill, Supervising Architect of the Treasury Department.

MUSEUM. — Museum of Fine Arts. Messrs. Peabody & Stearns, architects, Boston. Cost, $75,000.

HOTEL. — Southern Hotel. Taylor & Barnett, architects. Cost, $250,000.

STORE — Dry goods store for Moffet & Chouteau. Taylor & Baruett, architects. Cost, $200,000.

General.

ALBANY, N. Y. — U. S. Court-House. Mr. J. G. Hill, Supervising Architect. Appropriation, $305,000.

ATCHISON, KAN — Union Depot. Cross & Taylor, architects, Kansas City, Mo. Cost, $87,000.

BURLINGTON, Io. — County Court-House. P. E. Hale, architect. Cost, $100,000.

CHESTER, ILL. — Penitentiary. Bell & Hackney, architects, Springfield. Cost, $850,000. 214 x

CHESTER, PENN. — Church of St. Michael. E. F. Durang, architect, Philadelphia. Cost, $60,000.

CLEVELAND, O. — Church. Heard & Smith, architects. Cost, $40,000.

COHOES, N.Y. — Hotel. Ogden & Wright, architects. Cost, $60,000. 207 &

DAYTON, O. — County Court-House. Mr. L. Beavers, architect. Cost, $100,000. 213 y

— Presbyterian Church. Wheelock & Clay, architects, Chicago. Cost, $60,000. 214 y

DENVER, COL. — Stores. W. J. Edbrooke, Chicago, architect. Cost, $140,000.

DES MOINES, Io. — Court-House. P. Hale, architect, Chicago. Cost, $86,000.

DETROIT, MICH. — The Rotunda. Lloyd & Pierce, architects. Cost, $160,000.

DORCHESTER, CAN. — Penitentiary. Thomas S. Scott, Ottawa, architect. Cost, $120,000.

FLUSHING, N. Y. — Chapel for the Academy of St. Joseph. W. Schickel, architect, New York. Cost, $45,000.

GARDEN CITY, N. Y. — St. Paul's Cathedral School. Mr. E. D. Harris, architect, New York. Cost, $250,000.

HARTFORD, CONN. — Courant Office. G. Keller, architect. — House for Cornelius J Vanderbilt. Cost, $60,000.

INDIANAPOLIS, IND. — State House. Mr. E. May, architect. Cost, $2,000,000.

LEBANON, PA. — St. Luke's Church. Henry M. Congdon, architect. Cost, $70,000.

LINCOLN, NEB. — State Capitol. W. H. Wilcox, Chicago, architect. Cost, $400,000.

MANSFIELD, O — Jail. D. W. Gibbs, architect, Toledo, O. Cost, $60,000.

MERIDIAN, MISS. — Court-House. Moser & Tucker, architects. Cost, $25,000.

MIDDLETOWN, N. Y. — Homœopathic Insane Asylum. C. Pfeiffer, architect, New York. Cost, $125,000.

MILWAUKEE, WIS — County Insane Asylum. H. C. Koch & Co., architects. Cost, $135,000. — Chamber of Commerce. E. T. Mix, architect.

NEWPORT, R. I. — Casino. McKim, Mead, & White, architects, New York. Cost, $70,000. 214 y

NORTH EASTON, MASS. — Hall for Oliver & Oakes A. Ames. Cost, $40,000. H. H. Richardson, architect, Brookline, Mass.

OMAHA, NEB. — Trinity Cathedral. J. F. Stuckert, architect, Philadelphia. Cost, $50,000.

ORANGE, N. J. — Music Hall. Silliman & Farnsworth architects, New York.

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THE last report of the Indiana State-House Commissioners, lately received, gives an account of the progress of work on their building to the end of 1879. The commissioners complain that the slow delivery of material, presumably stone, has considerably retarded the work, inasmuch as "it seemed impossible for those furnishing materials to comprehend the necessity for greater exertion," a complaint that is not unfamiliar to the supervisors of public buildings. They add a statement which, without further explanation, is of a kind to excite the envy of other builders, that by adding twenty inches to the height of the basement they have been able to slightly diminish the cost of the building. The whole expenditure to the end of the year has been $182,577, of which nearly one hundred and fifty thousand is for construction, and the rest for salaries and other expenses. The report of the superintendent, submitted with that of the commissioners, seems to indicate an intention to do the work with special care and thoroughness. The architect, by the way, seems to be quite lost sight of; his name not appearing once in the document, and his existence being acknowledged only by the entry of a trifling payment to him among the expenses. The concrete for all the foundations and the stone footings for everything except the dome are in place, according to the superintendent, and the foundation walls carried up to some five feet above the footings. In this work about fifty-four hundred cubic yards of concrete and a hundred and sixty thousand cubic feet of stone have been used.

THE most generally useful part of the report is the tabular statement of experiments tried on the strength of the cements offered for use in the building records, of which we can hardly have too many, provided the experiments are carefully and judiciously made, and which show a commendable desire to know what materials the commissioners are using. The cement used for the stone-work — an Indiana cement, Anchor brand — was tested constantly as it was received, twelve samples being tested from each car, and the average of that accepted being never below fifty pounds per square inch of tensile strength twenty-four hours after mixing. For use in the brick-work tests were made of five brands of slow-setting cements, — the Hudson River Rosendale, Anchor brand, Milwaukee, Arrow brand Rosendale from Buffalo, and Cumberland from Baltimore. The tests show the great irregularity and consequent uncertainty above a moderate limit of strength in the cements used. Thus, the quick-setting cement used in the foundations varies capriciously between fifty and one hundred pounds per inch of tensile strength in the record of some hundreds of experiments, without a preponderance that can be noticed anywhere in the scale. The tables for slow-setting cements record tests of thirty-five samples of each brand, tested for tenacity at intervals of one, two, and three days, and one, two, and three weeks; and for compression, at intervals of one, two, three, and four months. The Rosendale and Milwaukee brands seem to have been least successful under the experiments, and the Cumberland to have come off best.

THE average tensile strength after one week proved, in the order in which we have mentioned them, 107, 141, 87, 76, and 143 pounds per square inch; after two weeks, 122, 172, 119, 150, and 165 pounds; after four weeks, 148, 190, 136, 132, — no samples of the Cumberland cement being tested after two weeks, owing possibly to a deficient supply. The average resistances to crushing, in the same order, were at one month 684, 783, 545, 531, and 1,108 pounds; at two months, 711, 914, 501, 608, and 1,014 pounds; and at four months, 837, 974, 000, 631, and 1,145, the Milwaukee cement not being tested after two months. The cements which gave the lowest averages appeared also the most irregular, in the Rosendale brands varying capriciously from less than six hundred to over twelve hundred pounds in crushing strength, and the Milwaukee showed a nearly equal variation. The stronger cements were the quicker to set, the Cumberland and Anchor brands hardening in eleven and twenty-nine minutes, while the others took upwards of an hour. The experiments on the mortar and brick used did not show themselves so reassuring, we should say. Samples of mortar taken from the building after from two to four months' standing gave a minimum resistance to crushing of 160 pounds per inch, which is not a high strength; while the minimum strength of the bricks accepted is 45,000 per square foot (312½ per square inch), which is about a third that of really good bricks. We may hope such material will be used more cautiously than has been the case in some buildings of which we have heard lately. The uncertainty of tests, except when error is eliminated by a large number of observations, is shown by the record of the Arrow-brand cement, where the experiments indicate a diminishing tenacity in the samples broken after the second week, — a curious result, which must probably be ascribed to the accident of reserving weaker pieces for the later tests.

THE biennial report of the Capitol Commissioners of Iowa tells us that during the two years that have passed since the issue of the last report the walls and pavilions have been finished on the outside, and the whole building been put under roof, excepting the central dome, which is finished up to the top of its stylobate. This state-house, designed, like the Illinois capitol, by the late Mr. Piquenard, has been the object of peculiar care to the legislature of Iowa; which has appropriated a fixed sum out of each year's taxes, and so made clean work financially, as the building has gone on, although the progress has not been rapid. So minutely careful has the legislature been, indeed, in controlling both the design and the work, that at its last session, having ordained that the Capitol should have a large dome in the centre and four smaller domes on the pavilions, it declared that the building of the central dome should not be touched until a special appropriation should be made for it; and this in the face of a strong appeal from the architects, Messrs. Bell & Hackney, for means to finish the dome, on the score both of convenience and of economy. Consequently the commissioners and the architects now have found their building otherwise closed in, but with a large hole in the centre of it, for which they have no authority to provide the proper covering; and the reports of both commissioners and architects contain urgent appeals to the General Assembly, which holds its session this winter, to supply money and authority to cover the deficiency. In view of the inconvenience of this application of the popular theory which makes a legislature a jack-at-all-trades, we think the commissioners are fully justified in admonishing the Assembly that the best thing it can do is to leave the appropriations untrammelled, and allow the construction to go on systematically. It is not surprising that they should clinch their argument by adding that "the commissioners, who for eight years have devoted time, thought, and study to the subject, should be better qualified than any one else to conduct the finish of the building, and decide upon the order in which each of the parts should be finished," though this is perhaps a sweeping claim. Not better, we should say, than the capable architects whom commissioners are assumed to employ, and who give their whole lives to the business, but doubtless better than a popular legislature. We are glad to record that this dome, unlike many that we are acquainted with, is to be solidly built of stone. The spirit of thoroughness has also led the commissioners to have the question of heating and ventilat-

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ing made a careful study in advance, and to employ an engineer, Mr. Levi R. Greene, to make a complete scheme, with full drawings for this purpose. The specification, which we have received, provides for all the details of the work with a minuteness and precision which are unusual.

We have received a copy of the Constitution of the Canadian Academy of Arts, which has been lately founded under the patronage, and we believe at the suggestion, of the Governor-General and the Princess Louise. It is modelled in a great degree on the Royal Academy of London, and has for its objects "the encouragement of design as applied to Painting, Sculpture, Architecture, Engraving, and the Industrial Arts," and education therefor by means of a National Gallery, annual exhibitions, and schools of art. There are the usual three grades of members, Academicians, Associates, and Honorary Members. The Academicians are limited to the time-honored number of forty, among whom there shall be not more than ten architects, six designers (a new class in an Academy), and three engravers. The number is to be supplied from the grade of Associates, who are to be men of attainment as Painters, Sculptors, Architects, Engravers, and Designers, and are not to be less than twenty. Both Academicians and Associates must be British subjects, or foreigners who are permanent residents in the Dominion; but there is an order of Foreign Academicians to be chosen at will at the annual meetings. There are also Honorary Members to be chosen among amateurs, who are invited to make an annual contribution and who are headed by the Governor-General himself with a contribution of five hundred dollars. Provision is made for a class of retired Academicians who are to receive pensions. Every Academician is required, as a condition for the receipt of his diploma, to present to the National Gallery a picture or other specimen of his work. The government of the Academy is vested in a council of twelve Academicians serving in rotation; its officers, the president, vice-president, treasurer, and secretary, are nominated by the Governor-General and elected by the Academy, the president and vice-president being chosen for five years, and the secretary and treasurer annually.

Nothing specific is said about the establishment of schools, but provision is made for the appointment of professors of Painting, Sculpture, and Architecture, who are to be Academicians, and for professors of Anatomy and Chemistry, who need not be so, all of whom are to be appointed for five years. There are also to be professors of Ancient History and of Ancient Literature, and an Antiquary, — honorary appointments, apparently, which may be permanent. The Annual Exhibitions are to be held by rotation in the principal cities of the Dominion, of which Ottawa, Halifax, St. John, Quebec, Toronto, and Montreal are specified. The Exhibitions are open to all artists of distinction for paintings, sculpture, architectural and decorative designs, and engravings. But copies except those in enamel are excluded, nor are "needlework, artificial flowers, cut paper, shell-work models in colored ware, or any such performances" admitted. Each Academician or Associate is allowed to exhibit ten pictures together; outside exhibitors are allowed four, and all must be in gilt frames. The first exhibition is appointed to be held early in March at Ottawa, and pictures or other exhibits will be received from February 16 to February 21. The Governor-General offers a bronze medal for the best ornamental design for use in manufacture, the subject being from the Canadian flora. Prizes are also offered for other decorative designs, — a cabinet, a wall-paper, a mediæval sideboard, a book-cover, and a door filled with stained glass. We presume that the establishment of this Academy results directly from the coming to Canada of the Marquis of Lorne and the Princess. No doubt it will be a strong stimulus to the development of art in the Dominion, both by the encouragement of artists and by arousing a public interest in their work. The direct encouragement of decorative art is a departure from the usual habit of academies, as is the large share in the Academy allowed to architects; but both would seem to us peculiarly apposite to the conditions of the Dominion. There will undoubtedly be special effort to make the first exhibition attractive. We should like to believe that it would attract a good showing from artists in the United States, for the sake at once of good fellowship and of the interests of art.

The complex underground piping of our city streets is beginning to show its dangers convincingly. In most city streets there are at least three sets of pipes which are constantly endangering each other, and one or another of which is constantly in need of looking after, — the gas-pipes, water-pipes, and sewers. When we add to these what are found or intended in some of our cities, and what may be common in all before a great while, — a system of steam-pipes and pipes containing telegraph wires, — we have endless opportunity for interference and confusion. Gas explosions in sewers are becoming unpleasantly common. We noticed two of them in our Summary not long ago. The last number of the *Iron Age* described one that occurred recently in a crowded part of New York, at the corner of Sixth Avenue and Forty-second Street. The diagram with which the account is illustrated shows a network of conduits, which might prepare one to expect any disaster. In each thoroughfare are five lines of gas-pipes and a sewer; in Forty-second Street two sewers and two lines of water-pipes, one of those in Forty-second Street being a 48-inch main. On the surface in the Avenue is a horse-railroad track and the double line of the Elevated Railway. All these lines intersect at the crossing; and in the air, spanning the intersection, is the station of the elevated road. The pipes are turned and bored and sagged to avoid each other, and the supports of the elevated road have to be planted as carefully as a man would tread among eggs; sometimes forking above the pipes, sometimes thrusting them aside, to get a footing; for the pipes are spread all across the streets, and there is no placing a line of rails so as to avoid them.

Such a condition of things is as inconvenient as can well be imagined, and full of hazard. The streets of our cities are forever open for the sake of repairs or connection to some of these pipes, to the interruption of traffic; the ground, continually disturbed, is continually settling, with dislocation of the pipes below. The gas-pipes, water-pipes, and sewers are forever breaking, corroding, leaking, mixing their contents, and impregnating the soil, to the discomfort and danger of the citizens. No more extravagant way of doing the thing could be devised. The trouble is that it grew from small beginnings. If an engineer were called upon to provide at once for seven lines of gas and water pipes and a large sewer, to say nothing of steam-pipes and telegraph tubing, which may follow, to be put underground in a busy thoroughfare, full of vehicles, and pervaded by four railroad tracks, we may assume that he would not dream of laying them side by side and burying them up in earth, so that every time that any one had to be visited the street must be blocked and earth and pavement be removed and relaid. He would decide, we may assume, that convenience and economy made it best, once for all, to construct a gallery in which all these conduits could be carried, and where, having been arranged once for all, they could be visited, examined, altered, replaced, tapped, or repaired, without interfering with what went on at the surface of the street, without excavating and filling, repaving and repairing. To such subterranean galleries one city has already come for its most important underground connections, and other cities must, it seems to us, ultimately come.

The cost of these sub-ways is large, but yet it is trifling compared with that of laying out or widening new streets, which are among the things which cities are found willing to do. It would not be so very much beyond that of constructing the large sewers which great cities find necessary. It is probable that the cost of excavating, filling, and paving for the successive lines of pipe, in such a street as we have described, would alone be an equivalent. In the long run the saving would be enormous. It is pretty sure that in the course of a generation every line of pipe under a thoroughfare will be visited, and most of them many times. If we add to the cost that of the constant repairing of damage due to interference, corrosion, and settlement, the loss from undiscovered leakage, the injury to property and health from escape of water, gas, and sewage, the cost and inconvenience of hunting out defects which would be detected at once in exposed pipes, and the intolerable annoyance of having great highways ripped open from month to month and year to year, we may wonder that these things have been endured so long. A good portion of the cost of such sub-ways might, as we have before suggested, be recovered to the city treasuries by a tax upon the gas companies, and others which used them, without oppression, and the rest would soon save itself to the public. Those large cities which are proposing, like New York, to exact a royalty on the franchises which they grant for underground steam-heating will do

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well, it seems to us, to consider whether there is not here an opportunity to take the first step in behalf of a system whose necessity is made greater by every line of pipes that is laid; and of which the saving will be the greater, and the cost the less, the sooner it is undertaken.

ELEVATOR SHAFTS. II.

WITH reference to fire protection, the relative value of shafts with closed doors and open elevators with hatches, whether automatic or worked simultaneously from the first story, may be stated thus. A shaft elevator is a continuous flue. Any one door being open, fire may enter and pass up through it. If properly constructed, the flames will pass out harmlessly at the top, but in time will be likely to heat the doors. Any one door being open on an upper floor would allow the flames to spread. Hence a closed shaft is only safe if all the doors are closed. In an open elevator, on the contrary, if provided with proper hatches, one hatch, if closed, will stop the fire on all floors above it. If all are closed the fire will be confined to the floor on which it starts or would have to destroy a number of hatches successively. Hence, according to the doctrine of chances, the open elevator with hatches is the safest.

Open elevators are less expensive than closed shafts. An enclosure not more than six feet high is sufficient to prevent accidents. It may be either of wood-work, wire-work, or a wrought-iron railing. Wire-work in a strong wrought-iron frame forms the best enclosure, as the meshes in it may be small and it does not obstruct light materially. For a freight elevator an enclosure of slats and posts three feet high is often sufficient. Enclosures should be provided on each floor with a door or gate. It is better that they should be automatic or arranged to open only on the floor where the elevator is in use, and to close as soon as it passes. Such doors and gates are now used in many places with good success.

For fire protection all that is essential is a proper system of hatches. The old system of having hatch doors to be opened and closed on each floor successively is useless in the emergency of a sudden alarm of fire when the elevator is in use. It is only valuable in case of a fire occurring after the close of business and supposing that all the hatches have been closed. This presupposes a thoughtfulness and vigilance which are seldom met with. Only two methods of working hatches are effectual in stopping fire in case of a sudden emergency. Either the hatches should be worked automatically by the movement of the elevator, or they should all be connected by such machinery as will enable them to be operated simultaneously from some convenient point of easy access. The former system is the best, as it does not rely upon human vigilance at all. But it presupposes the existence of a good mechanical device, which is unfailing and easy of operation, and not liable to wear out or get out of order. In fact, in its mechanical work it must be fully as good as the machinery for operating the elevator. There are several kinds now in use, some of which are scientifically constructed and fill all the requirements, but many cheap devices have utterly failed. There are also several devices in practical use for operating all the hatches simultaneously from a single point. The essential qualification is ease and rapidity of movement. For they may have to be closed when delay is dangerous to the person closing them. Some have the advantage of closing by the action of fire, by the use of either fusible links or combustible ropes. But fire works with speed and may pass through the hatch before closing it.

The greatest difficulty that has been met in placing hatches of any kind on power elevators has been found in the complicated system of ropes and weights placed in the shaft by elevator makers and the projection of guide posts and safety racks. No elevator machinery, however, is made in which proper modifications cannot be made to allow the use of hatches, and without detriment to the proper working of the elevator. This is a matter which has never been taken into account by the builders of elevators. Another difficulty has been found in getting the hatches properly out of the way when opened on each floor. There are several ingenious devices for accomplishing this.

The material for hatches is another important consideration. The mutual insurance companies which insure mill property require that hatch doors shall be of wood. In this case the wood must be in two thicknesses, or nearly two inches, to afford an effectual barrier to fire, and they thus become very heavy. Iron hatches may be made lighter by using angle-iron frames and filling in the panels with corrugated-iron. In these forms the iron is stiff, and less liable to buckle or warp than heavy iron would be. All mechanical appliances of wood are liable to wear out and are subject to expansion and contraction. Hence they are most likely to get out of order. The best hatch door for all purposes is an iron frame, welded in one piece, with a wooden panel, covered with tin on the under side.

The successful working of automatic hatches depends upon the steady and uniform motion of the elevator. If the motion is uniform they can be successfully applied to elevators running one hundred feet per minute. It should be remembered that all automatic hatches are attachments to *floors* and practically form continuations over them; consequently they cannot be applied to enclosed shafts. No automatic hatch has yet been invented which will operate within a vertical shaft. There never is room between the car and the sides of the shaft to contain the hatches and operating machinery.

No automatic hatches should be used as a protection to prevent persons from falling. They should always be enclosed as above stated with guards having gates or doors. This is evident from the fact that either a person stepping on such hatches would be injured in case the car should approach, or if the machinery were not strong enough to throw off the additional weight which it was not intended to carry, it would certainly be permanently disabled.

The safest way to arrange a passenger elevator, say for hotel use, would be to have it pass through a fire-proof waiting room on each floor. The room should have an iron door with spring hinges and an outside window for light. The elevator should have automatic closers and an automatic gate, in a wire enclosure six feet high. The cab should be finished on the outside with panelled sides, having fine wire gauze inserted therein, and should have a light sliding door with wire gauze panel, only to be opened when passengers are to get on or off. The waiting rooms will form an additional safe-guard to prevent fire from spreading on any one floor in case the automatic hatches should not do so. They are also a necessary convenience to people who may be waiting for the elevator.

In conclusion, it may be needless to add that in planning a building the architect should carefully provide for everything connected with the elevators when the plans and specifications are prepared. He should decide at the outset just what he intends to recommend to his client, and not leave such matters for after consideration. Thus all cutting and alterations in the building will be avoided, and it will not be necessary to modify or alter one kind of work in order to provide for another. It is not the object of this paper to suggest anything as to the kind of operating machinery to employ, but it is equally essential that it should be decided early. Architects too often leave the decision or selection of such matters to their clients, or the clients, on the other hand may take them out of the architects' jurisdiction. Either course is unwise. The architect should be a competent judge of what is safe or unsafe in construction or arrangement, and it is hoped that these suggestions may be of some assistance to such as desire to avail themselves of other experiences than their own.

W.

ROMANESQUE ARCHITECTURE.[1] IV.

BUILDINGS of the Primitive Romanesque style are, as I have already said, rare throughout Europe. In England especially we have no surviving buildings of any great size earlier than the introduction of the Norman form of Romanesque in the eleventh century. We have nothing left but a few small and rude fragments, and a very remarkable class of towers which enables us easily to identify the early Romanesque of England with the contemporary work of other lands. Still we have evidence enough to show that both the square pier and the column were used in England, though the few columns that remain, as at Repton and as responds in a good many chancel and belfry arches, are certainly of wonderful rudeness.[2] But though they often affect a good deal of barbaric richness, we find in them no sign of the distinctive features of the Norman style, while many of them do show an uncouth imitation of Roman work. But while in England we have to patch up our case from very small, rude, and mutilated examples, we find scattered here and there over the continent a considerable number of examples of greater size, belonging to various dates up to the middle of the eleventh century. Various buildings showing more or less of the features marking our so-called Saxon style, the pilaster-strips, the baluster-columns, the mid-wall shafts, and the other characteristics of the style, will be found scattered here and there over various parts of Germany, France, Aquitaine, and Burgundy. The general mass of the German examples I put by for the present, as the architecture of Germany has a distinct history of its own. But one German example must be mentioned here as standing at the head of its class. The great gateway of the Abbey of Lorsch — the Lauresheim of the days of Charles and Eginhard — remains almost alone as a work of the days, seemingly of the earliest days, of the great king himself. Of the Lorsch gateway the lower story, with its Corinthian half-columns not yet flattened into pilasters, might almost be called Roman rather than Romanesque; but the upper stage, with its flat pilasters, its unclassical capitals, its straight-sided arches, shows that we have reached a class of buildings of which Deerhurst and Earls Barton are members. But Lorsch stands by itself; among ordinary specimens of the Primitive style, the first place is certainly due to a building in quite another region of the Empire, to the church of Romainmoutier in the present canton of Vaud. Here we have a minster of considerable size, with two clearly marked Primitive dates, belonging, if I rightly remember, to the eighth and ninth centuries, and with a little later Romanesque work to contrast with them. The piers of the original building are rude enough, very massive, but with an evident attempt at the columnar form. It is curious to compare them with the later and not very distant church of Grandson, where we feel almost carried back to Lucca in its thoroughly basilican arcades, where Roman columns have been used up again, and fitted with elaborate capitals, seemingly of the twelfth century. Two other churches of Burgundian Switzerland, on a much smaller scale than Romainmoutier, Saint Sulpice in Vaud and Saint Peter in Wallis,

[1] See pages 28, 37, 45, *ante*.

[2] Sompting in Sussex, St. Benet's at Cambridge, and Earl Odda's Church at Deerhurst supply some of the best examples. The Cambridge example is doubtless much earlier than the other two. The use of columns in England in the seventh century is witnessed by Eddius, the biographer of Wilfrith, who speaks (Vita Wilf. 17) of his church at Ripon as "basilica polito lapide a fundamentis in terra usque ad summum aedificata, variis columnis et porticibus suffulta."

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are also useful as supplying the contrasts between earlier and later Romanesque. The *Basse-Œuvre* at Beauvais, that is the nave of the cathedral of the tenth century, the Temple of Saint John at Poitiers, the church of Saint Aventin in the Pyrenees in the modern department of Haute-Garonne, the crypt under the apse of the Abbey of Pleinpied in Berri, some parts of the Abbey of Brantôme in Perigord, all supply studies of Primitive Romanesque, in different varieties and of different dates. And at the end of our list, putting to shame even Romainmoutier at the beginning, comes the original and still perfect shell, but slightly masked by a recasting of the twelfth century, of the "micele mynster æt Rémys," the mighty Abbey of Saint Remigius, the church hallowed by the Roman Pontiff in the presence alike of the Cæsar of the mainland and of ambassadors from the Basileus of the island Empire.[1] The church where a son of Ælfgar was buried, and on whose massive pillars Gyrth looked while they were still in their freshness, has advanced many degrees beyond the work of Benedict Biscop at Jarrow and Monkswearmouth, but it still belongs to the same great class; it shows no sign of the distinctive features of the later local styles; it still belongs to the days when a common form of art, such as it was, prevailed throughout the West.

But it is the towers which give us the best evidence for the unity of the architectural style of all Western Christendom up to the eleventh century. The "Saxon" towers of England, the tall, square, hard, unbuttressed towers, with the mid-wall shafts of their windows, their rude enrichment of square strips and long-and-short work, are familiar to every student of such matters. Sixteen years ago I was surprised and delighted to come upon a group of towers of essentially the same character in the heart of the Pyrenees, gathering round that striking minster of Saint Aventin of which I have already spoken. In later journeys I came across towers of essentially the same kind in the great Burgundian Abbey of Saint Maurice [2] and in the great Swabian Abbey of Schaffhausen.[3] So close a likeness in such distant spots could hardly be the result of accident; it could hardly be the result of copying from one another. Earls Barton and Saint Aventin were not likely to seek their models at Schaffhausen, and Schaffhausen was still less likely to seek its models either at Earls Barton or at Saint Aventin. But all roads lead alike to and from Rome, and I felt convinced that the key to the likeness was to be found in all being derived from a common Italian source. The likeness among the various forms of Romanesque architecture answers to the likeness among the various dialects of the Romance speech, and it is to be accounted for in the same way. As I carried my researches further, I found towers of the same type in every part of Germany which I visited, at Dortmund and at Bremen, at Coblenz and at Würzburg. I found the banks of the Main and the Alpine pass from Innsbrück to Trent set thick with them. Once south of the Alps there was no longer any doubt about the matter. The smaller and ruder examples of Italian towers are identical with those in our own land. There are towers at Verona and at Lincoln which might change places, without either seeming to be in a strange land. If Schaffhausen and Saint Maurice seemed like glorified forms of our own rude "Saxon" towers, the great Saint Zeno seemed like a glorified form of Schaffhausen and Saint Maurice. The matter seems absolutely beyond doubt. Up to the eleventh century, no less than in the seventh, men went on building "*juxta Romanorum morem.*" They followed Roman models, not only by some vague tradition, but by a conscious imitation of the buildings, whether of the Eternal City itself or of the hardly less renowned cities of Lombardy and Tuscany.

The little that I have to say of the buildings of Germany will find its best place at this point. It seems to me that, while in other countries the Primitive or Italian mode of building was actually displaced by new developments of art, in Germany the Primitive style of Romanesque went on, improved but not displaced, through the eleventh and twelfth centuries, till all Romanesque everywhere began to give way to Gothic. The German churches of the twelfth century show us, in a greatly improved form, many features which in England or Gaul we should unhesitatingly assign to a date not later than the eleventh. The difference, small as it is, between the earlier and the later Romanesque of Germany may well be studied in the churches of Soest, — that strange, shrunken-up Westphalian Hanse town, — especially in the two great churches of Saint Peter and Saint Patroclus. At the other end of the kingdom, the Great Minster at Zürich of the twelfth century does not differ essentially from the work at Schaffhausen of the eleventh. The work is rather more finished and rather more enriched, and that is all. Here, as at Mainz and Dortmund, and in countless other German churches, the massive square pier prevails, and it seems to me that one of the changes which mark the later German style is that the square pier now became dominant, and drove the column, for the most part, into quite secondary positions. In the two great Romanesque churches of Hildesheim, Saint Michael and Saint Godehard, we find, as in many Italian buildings, the square pier and the column alternating or intermingled. The capitals are of various strange forms, but what is most to be noticed is that they retain the Ravenna stilt, which appears also, perhaps in a less marked form, in the elegant chapel of Bishop Meinwerk at Paderborn.[4] The alteration of the square pier and the column, but without any of the eccentricities of Hildesheim, appears in the Church of Saint Burchard at Würzburg, a building of the eleventh century of distinctly Primitive style. But the use of the column by itself seems in Germany to be confined to quite small buildings, such as the thoroughly basilican Church of Saint James at Bamberg, or in the two castle chapels one over the other at Nürnberg, utterly contrasted as the two are in the proportions of the columns employed. The massive round piers, columnar or *quasi* columnar, with which we are so familiar in England, seem never to have been used in Germany at any time. With regard to the towers, the belfry-windows of the twelfth century supply a remarkable study of the way in which the Primitive coupled window with mid-wall shafts gradually changed in some cases, during the latter half of the twelfth century, into something more like the ordinary belfry-windows of our Norman, while in other cases the hardly modified Primitive belfry-window went on to the end of the twelfth century, perhaps even into the thirteenth. Here and there we find German buildings late in the twelfth century, or even early in the thirteenth, like the palace at Gelnhausen and some parts of the cathedral at Trier, which are still purely Romanesque, but which rival the richest and lightest buildings of the later Italian Romanesque. But, as a rule, much of the Primitive feeling hangs about German Romanesque down to the time when it finally gave way to Gothic. The towers especially, tall, square, unbuttressed, with their shallow pilasters and arcades, keep on Primitive forms through the whole of the Romanesque period, and even hand it on to many examples of the earlier German Gothic. That wonderful grouping of the many towers of the German churches which goes on through the whole Romanesque age, and which gradually dies out with the development of Gothic, is a purely national feature which has nothing the least like it either in Gaul, in England, or in Italy. And the churches themselves, the great minsters even more than the smaller ones, in their comparative plainness, their lack of artistic composition in the main arcades, the general squareness and hardness of detail, the use of the double splay in the windows, all seem to belong to an earlier stage of art than the contemporary buildings of England and France.

[1] See Norman Conquest, ii. 111, 456, 2d ed. The consecration was in 1049, at the very end of our period, when the later Romanesque was already coming in. But the work must have been begun many years before.

[2] The present tower was built, partly out of Roman materials, by King Rudolf of Burgundy in 1014.

[3] The tower and the whole church are of a piece. I feel sure that the date is 1040, but I cannot at the moment lay my hand on any authority.

[4] The date is 1008.

FURNACES AND FURNACE MATERIALS.[5]

The advantages claimed for the soapstone furnace are that it is absolutely impermeable to gases;[6] uniformity of heat is easily maintained; the amount of soapstone forming the radiating surface of a single furnace (from two to six tons) furnishes such a reservoir of heat that sudden changes of temperature in the house are impossible; great durability, tightness of joints, owing to the slight change of the parts by expansion and contraction under changes of temperature, and the similarity of these changes to those of the cements used in the joints; and complete and even combustion of the fuel, owing to the slow heat-conducting power of soapstone and to a special arrangement within the furnace for supplying warmed air to the fire. A soapstone furnace tested for five years by the writer, in a house built by him at the West End of Boston, has proved itself a safe, pleasant, and (after the first cost) economical heater.

The disadvantage of the soapstone furnace is that the large amount of radiating surface required involves considerable expense and occupies somewhat more space than an ordinary iron furnace.

A leakage of gas, then, in hot-air furnaces may result, first, from porosity of the material; second, from looseness of the joints; or, third, from cracks at the feed and ash-pit doors. The first and second difficulties may be obviated by using wrought-iron, terra-cotta, or soapstone. The third may be to a certain extent, though not absolutely, avoided by adopting the ground and bevelled joints used in the Reynolds "Air-Tight" furnace.

Where a cast-iron furnace is already set, or where it is inconvenient to adopt either of the two courses recommended, the furnace should be so run that there is a constant inward pressure from without. The pressure may be easily measured by attaching to the highest part of the heating surface a manometer, as already described. In fact no drum furnace is complete without this attachment. The manometer may consist of two simple quarter-inch glass tubes one foot long each, united at the bottom by a bend or by a rubber tube, half filled with water, and attached to the furnace by a brass tube screwed into the drum. The whole need not cost over seventy-five cents, not including the labor of attaching it to the furnace.

To insure a constant inward pressure it will be necessary to keep the temperature of the smoke-flue quite high, and, unless some principle like that illustrated by Fig. 129 be adopted, a great loss of heat will be sustained. The principle, under a modified form, varying with the circumstances, as will hereafter be described, may be applied to any furnace.

Though the escape of gases may be due largely to the permeability of the materials, yet imperfect joints form a source of leakage equally, if not more, important. As above remarked in describing the experiments on the permeability of cast-iron, a small amount of the mercury passed through the iron under the feeblest pressure.

[5] This paper by the writer of the Open Fire-Place articles will be incorporated with those articles in their separate form.

[6] A piece of soapstone tested with other substances by the writer under a moderate pressure proved impermeable to air.

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Only a fraction of an atmospheric pressure was necessary to drive it through the largest pores, and in the experiment of Professor Gibbs no pressure at all was used above that of the mercury in the vessel itself tested. The holes were too small to be visible to the naked eye and would, therefore, escape detection under the ocular examination of the inspector. Yet with the aid of a microscope many could be seen, and would consequently allow water to work through under a pressure of a few millimeters head, or sufficient to overcome its attraction. This proved, by experiment, to be the fact. In the case of gases, friction would only retard their movement, while attraction might prevent altogether the passage of liquids.

As the only certain cure for escape of gas through the pores of the material is to discard porous materials altogether, so the only cure for escape through joints would be to discard joints altogether. This being impossible, the next best thing is to choose a furnace in which the number of joints is at a minimun, and to run the furnace in such a manner that the outward pressure shall always be at a minimum. Whether or not this may be done without loss of heat will hereafter be seen. Furnace makers will claim that the peculiar kind of cement they use, or their peculiar method of hammering the joints, will prevent leakage and stand fire. The writer visited a furnace advertised by the makers to be absolutely gas-tight. The joints were numerous. In some joints cast-iron was connected with wrought. Pipes of cast-iron were set into wrought-iron plates — an arrangement the reverse of that used in the Dunklee furnace. To this the writer particularly objected, and inquired of the makers if they could warrant the furnace to stand test at these points. The method of working these joints was, they claimed, *peculiar*. No cement was used, and so great was the care bestowed on each joint that leakage was a sheer impossibility. A fine new furnace was exhibited to show the excellence of the workmanship. The writer still objected until challenged by the makers to give proof of any of the numerous furnaces put up by the company having ever leaked gas. Without taking the time to visit any or all of the five hundred or more gentlemen whose letters of recommendation adorned the descriptive circular of the firm, the writer expressed himself satisfied if the fine new sample furnace then on exhibition would itself stand the test. With the assurance that he was at liberty to make any reasonable test he pleased, he ordered the furnace to be turned over and water poured into all the joints. To the complete astonishment of the proprietors and of the careful workmen standing around, the water which was poured in poured out again through nearly every one of the score of careful joints, until the furnace seemed to dissolve, and float away in its own tears.

The way in which an escape of gases in furnaces may be caused by the pressure of the wind is very clearly expressed by Dr. Lincoln.[1] But it must be borne in mind that the wind is not the only cause of reversed pressure. Dr. Lincoln says: "In the case of hot-air furnaces it is very desirable to make the seams actually impervious to gas. This cannot be done with the ordinary materials, — cast-iron, putty, and red-lead. The unequal contraction and dilatation of the pieces of casting inevitably crack the putty or cement, a matter of small moment provided we were sure of a constant atmospheric pressure inward. But we cannot be sure that such a pressure will continue under all circumstances; and the manner in which the direction of the pressure may be reversed is easy to understand. For the iron wall of the furnace represents a diaphragm between two boxes, from each of which a powerful current ascends. One of these boxes is the stove itself, discharging into the chimney; the other is the hot-air box or reservoir, discharging through pipes, registers, halls, and stairways, — all of which taken together may form a kind of rival chimney drawing upon the hot-air box with a force nearly or quite equal to that of the actual chimney. Then the direction of the wind may be such as to favor the exit of air from the box by the duct intended to admit it, and if, under these circumstances, a puff of wind strikes the chimney unfavorably it is not strange if the pressure should be for the time reversed, and gas escape into the box. In point of fact this not rarely happens in furnaces of cast-iron. A suitable material for avoiding this exists in wrought-iron, which can be made perfectly tight by overlapping, riveting, and hammering the edges. Stone furnaces can be made tight also." The furnace room should be ventilated to carry off accidental leakages or puffs of gas when the feed-door is opened. The cold-air box should be made of brick or stone and made perfectly tight, with a clean-out door favorably placed, and the fresh air should be taken from a spot where it is most likely to be pure. It is best to take it from an enclosed spot as little affected by winds as possible. If no such chamber exists, or can conveniently be made, it should be taken in separate ducts from both windward and leeward sides of the house, and proper regulating valves supplied in the ducts, to be operated, if possible, from the parlor or sitting-room by means of wires and cranks. Strictly speaking the fresh-air box should be large enough to supply all the flues, allowing one sixth for expansion after heating, so that the longer hot-air flues shall not draw air from the shorter ones, as sometimes happens.

The amount of water evaporated in a furnace to give the air the desired moisture depends upon individual taste and temperament, upon locality and climate, and cannot be definitely specified. The supply should, however, be automatic. The ball-cock used should be of a kind least liable to get out of order, and should be protected from dust.

It is worth while here to remark, as a consideration of some little importance in finishing a house, and one frequently overlooked by owners and architects, that the evaporating pan should be emptied and the water-pipe temporarily plugged up on the furnace side while the inside finish of kiln-dried stock is being put on. Otherwise the evaporating water will rapidly reënter the wood before it is in place, cracks will result as the house grows old, and the advantages of kiln-drying will be partially nullified.

[1] The Atmosphere, by D. F. Lincoln, M. D., in Buck's Hygiene and Public Health.

FIRE-PROOF BUILDING IN VIENNA.

IT has been said that it is impossible to make a building absolutely fire-proof, but I think the Viennese come as near making buildings fire-proof as possible. I will cite some instances to show this: While living in Vienna I and my family went out of town to spend Sunday, and on our return we found that a fire had destroyed completely the first story of the building in which we lived, but our own apartments were in no wise injured. In another instance the inhabitants of the lower story of a building were not at all disturbed at a fire that occurred on the roof. The roof was entirely destroyed, but they kept about their usual occupation during the fire, inasmuch as the burning of their roof was of no very special interest to them. In Vienna the roof is not a part of the building at all; it is simply an appendage. The building ends in the ceiling below, and there is as much space as six inches left open between the top of the wall and the bottom of the roof, the latter being set on stones resting at intervals on the walls. The upper ceiling is a flat plank roof covered with ashes or sand, so that if the outer roof burns off, the coals and ashes fall on top of this sand and do no harm. There are no dwelling-rooms in the attic, and it communicates with the house by an iron door with iron casing, which is always kept locked. Next, as to floors: In the smaller buildings where timber floors are used the spaces between the timbers are filled with ashes or sand and then the plaster is attached underneath to a wire gauze, thus making a solid floor, which it is almost impossible to burn. There are no air-spaces left through which the fire can travel.

In the more important buildings, however, iron I-beams are used and brick arches are constructed between them, the upper side of the arch being covered with small beams, which, however, rest only on I-beams; and on these small beams the parquetry floor is laid, and underneath the arch is the frescoing; thus making a very handsome appearance. As to the walls: These are, for small buildings, never less than eighteen inches thick, and in large buildings the thickness varies from three to ten feet, the walls of the first story being thickest, and the thickness diminishing as we ascend. I read from the building laws of the city of Vienna as follows: —

(1.) When the position of a building is such as to make it desirable, as a precaution against fire, the ground floor must be vaulted. In the attic and in the first story, when the ground floor is not vaulted, the floors must be massive (as described), and a layer of dry mortar, sand, or other incombustible matter must separate the beams from the planking.

(2.) Stables and hay lofts must have a fire-proof ceiling.

(3.) Rooms for storing fuel must be, in general, located in the cellar, and built of masonry. When they are in sheds of but one story they must, in addition, have a fire-proof roof.

(4.) In every building fire-proof stairways must communicate from the attic to the cellar, and with every dwelling, by means of fire-proof passages. (This implies that the vestibule should also be fire-proof; and it is, in fact, invariably vaulted, and has a flooring of stone or béton.) In buildings of great extent there must be several such stairways, sufficient to enable all persons dwelling in them to pass readily out of doors.

(5.) When a stairway is lighted by means of a skylight, the frame of the latter must be constructed entirely of iron, and rest, on all sides, on masonry rising above the roof.

(6.) All stairways and passages connected with them must have a fire-proof railing.

(7.) Wood-work must be removed from the interior surface of all flues by a thickness of at least six inches of masonry. The masonry of the chimneys must be plastered on the exterior, from the pavement of the attic to the highest point of the roof.

(8.) Each story shall be provided with at least one separate flue, passing without communication with any other to its exit at the roof. Where the beams of the floor rest upon the walls containing flues, an earthen pipe shall be inserted into the latter, having for its length at least the thickness of the whole floor, and for its thickness at least one inch. Every flue must have, at its commencement in the lower story, and also in the attic, a side opening, closed by two iron doors, closely shutting, and provided with a lock. Where several flues lie side by side they shall be closed still further by an iron bar and padlock, extending over the openings of all. All wood-work in the vicinity of these doors must be covered with sheet-iron.

(9.) All roofs must be covered with tiles, slate, metal, or some other fire-proof material. The wood-work of the roof must at no point be nearer than six inches to the pavement of the attic. Iron roof-frames must rest upon masonry alone; wooden cornices are forbidden.

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(10.) The attic roof must be covered with tiles, cement, or other fire-proof material. An iron door, hung in an iron frame, must communicate alone from the main stairway with the attic. At least once in every ninety feet of its length the attic must be subdivided by a brick wall running across its width and rising nine inches above the roof. (This is generally covered above with zinc.) The compartments ensuing shall communicate with each other only by means of iron doors hung in iron frames. No dwelling-rooms are permitted in the attics of buildings.

(11.) Every house shall be provided with a wall at least six inches thick, separating it from its neighbor, — for the two houses thus ensues a wall of twelve inches.

The thickness of walls must be regulated by the weight they have to support and the material of which they are composed; also by the height of the stories and the construction of the floors and ceilings.

The following rules are to be observed: —

(*a.*) The principal outer walls, as well as all interior walls, at the point where they contain flues, must be at least eighteen inches thick. The principal walls of the upper story must be at least two feet thick if the depth of the rooms is more than twenty feet. The main walls may have the same thickness in two successive stories. In buildings of three stories the main walls must, at the ground, be at least two feet thick; in buildings of four stories at least two and one half feet thick. Those portions of the main wall which do not support floors can be made eighteen inches thick for all stories.

(*b.*) Where the ceilings are vaulted and rest on iron girders, in case the latter are not more than twenty feet long, the walls supporting them need only be eighteen inches thick for all stories; where they are of greater length the walls must be two feet thick.

(*c.*) The foundation walls must, in all cases, be six inches thicker than those of the lower story.

(*d.*) In light walls, the walls must be in all cases eighteen inches thick where they support ceilings, or bound rooms used for dwelling purposes. In other cases they need be only twelve inches thick.

(*e.*) Walls supporting massive floorings of half or whole trees (as described) must be two feet thick, and the trees must rest for six inches at their ends upon the same.

In Vienna these laws are fully carried out, and the Viennese hardly suffer from fire. — *Mr. H. A. Hill before the Society of Arts.*

THE ILLUSTRATIONS.

MERCHANTS' NATIONAL BANK BUILDING, BOSTON, MASS. MESSRS. G. J. F. BRYANT AND GEORGE SNELL, ARCHITECTS, BOSTON.

Originally a Greek temple with two columns *in antis*, on State Street, and built in 1824 as a branch of the United States Bank, by Solomon Willard, architect. Remodelled and the original rotunda or banking room of the temple altered into square rooms, and its height subdivided into two complete stories, by Cornelius Coolidge in 1836. Widened by the purchase of estates of the New England Life and Trust Company and Peter C. Brooks, in 1842, including rebuilding of these two estates with a Greek granite façade in pilasters and entablature, on Exchange Street, by Isaiah Rogers, architect, said building being incorporated as part of the original bank building. Widened for the additional length of the original bank estate by the purchase of the Columbian Bank estate, in 1856, of Peter C. Brooks, cornering on State and Exchange Streets, including an entire rebuilding of said estate three stories high (above the street levels), and an upright attic or fourth story, embracing also the addition of a third and fourth story over the entire area of the Merchants' Bank property, the latter story being faced with an upright mansard roof, fronting Wilson's Lane (since widened as Devonshire Street) and Exchange Street, said roof being uniform in level with the upright attic above named. The purchase of the Columbian Bank estate in 1856, and its rebuilding, together with the addition of a fourth story to the whole of the original property, resulted in facing the whole of the State Street side and a portion of the Exchange Street side with the present façades in granite. In this condition the whole estate, including all its purchases, remained until the partial destruction of the edifice by the fire of September 17, 1878, when the directors of the bank took into consideration the propriety of a general remodelling and improving of the property, in connection with the repairs consequent upon the fire injuries, resulting in an increased height to the building of one story of offices, enclosed within a wrought-iron mansard roof, and the changing of the exterior of the fourth or roof story from slating to granite façades, on Devonshire and Exchange Streets, thus completing, in connection with the granite attic story before referred to, the three frontages of the estate on State, Devonshire, and Exchange Streets, wholly of granite, surmounted by the wrought-iron roof, enclosing the new story of offices.

Within the building, the remodelling embraces a complete refinishing of the banking rooms of the first and second story (National Exchange Bank and Merchants' National Bank), including the construction of a dome in Neo-Grec style in the centre of the length of the latter apartment, reaching from the ceiling proper of the room through the third, fourth, and fifth stories and terminating immediately beneath the new iron roof in an elliptical skylight. The above remodelling further embraces a complete renewal of finish of most of the offices of the respective stories and as well the rebuilding of the principal staircases in the central hall of the building.

The architects and superintendents of the improvements made in 1856 were Messrs. Gridley J. F. Bryant and George Snell, the latter gentleman being the architect of the exterior, the former the architect of the interior.

The recent improvements of the property since the fire of September 17, 1878, have been made under the direction of Mr. Bryant, including the planning of the entire new interior and embracing, as part thereof, the new dome. The exterior design of the new roof is by Mr. Snell, the superintendence of its erection being in charge of Mr. Bryant.

DESIGN FOR A DWELLING-HOUSE AT LAWRENCE, MASS., BY MR. W. C. RICHARDSON.

ST. MARK'S CHURCH, ISLIP, L. I. MR. R. M. HUNT, ARCHITECT, NEW YORK, N. Y.

CORRESPONDENCE.

AMERICAN DECORATIVE ART AND ARTIST DECORATORS.

New York.

The familiar saying that "straws show which way the wind blows" shall serve for a text in calling attention to tendencies becoming every day more and more marked; we refer to the increased interest shown by modern painters, both here and abroad, in purely decorative work, and also to the facilities offered them by their patrons, which alone enables them to carry their ideas into effect. Certainly the architectural profession has every reason to rejoice in the prospect of such mutual help and coöperation between the two kindred arts as these straws of tendency would seem to promise us. The architects can do a great deal to foster this new movement, and it would show not only a narrowness of sympathy which it would be hard to pardon, but an utter blindness to their own interests, did they not meet the decorative artists at least half way. There does not seem to be the least danger that the painter will encroach upon the architect's legitimate field, whilst on the other hand he will give to the architect's work an additional beauty not otherwise attainable.

Confining ourselves to American artists entirely, we will go over a few of the names that have become prominently associated with decorative work within the last few years.

Mr. La Farge's work in Trinity Church, Boston, and in St. Thomas's, New York, has already become familiar to every one at all interested in such matters, so that we will pass them with a bare mention. Mr. La Farge, a few years ago, designed and superintended the execution of some of the stained-glass windows in the Memorial Hall, at Cambridge, and, encouraged by his successes in that direction, he is now devoting a great deal of his time to stained-glass work. He has now workmen in his employ, not only to carry out his designs as regards the cutting and leading of the glass, but, going a step back of that, in making the glass, that he may get just the tones and qualities that he desires. Some of the windows he has recently completed are remarkably beautiful; as rich and full in coloring as any of the old cathedral windows. They are free and original in their conception, and the treatment is, in all respects, appropriate to the materials employed and calculated to set off the peculiar and individual qualities of these materials to the best advantage. We feel tempted, in trying to describe the mellow effects of these windows, to resort to musical terms and call them symphonies and nocturnes, feeling that we cannot better express the effect they produced upon us, and yet hesitating to do so on account of the absurd misuse of similar terms as applied to oil paintings.

The late William Hunt's work, in the Capitol at Albany, has been fully discussed and described before. We will merely make mention of it, therefore, as being one of the pioneer works in the new field, with a few words of heartfelt regret at the great loss art has sustained in the death of William Hunt. Mr. Samuel Colman has recently been engaged in superintending the execution of some *portières*, from his own designs, in the work-rooms of the Society of Decorative Art, and the success he has achieved is unquestioned and will, we hope, encourage him to continue his efforts. He has succeeded in producing entirely original effects, without any of the affectation of oddity or misplaced quaintness that is so common, and, moreover, the entire treatment is made appropriate to the materials used and to the destination of the articles, and is thus, in the best sense, decorative. His success will open a wide field to the many needleworkers who, not having his power of originating new methods and designs, still have the technical skill necessary to carry out the ideas suggested to them by others. Mr. Colman is, therefore, doing excellent educational work, and at the same time achieving a personal success. Mr. Louis C. Tiffany is now devoting himself to the decorative art in a wider field, undertaking interior decoration in all its different branches, with a success that shows the value to him of his intimate knowledge of the East and of Japanese work. In the same field we would mention also Mr. Lockwood Deforest and Mr. H. M. Lawrence, both of whom have done excellent work already. A new accession, to us in America at least, although his decorative work is known in Rome, in Paris, and in London, is Mr. Charles Caryl Coleman, whose studio is in Rome, but who is in

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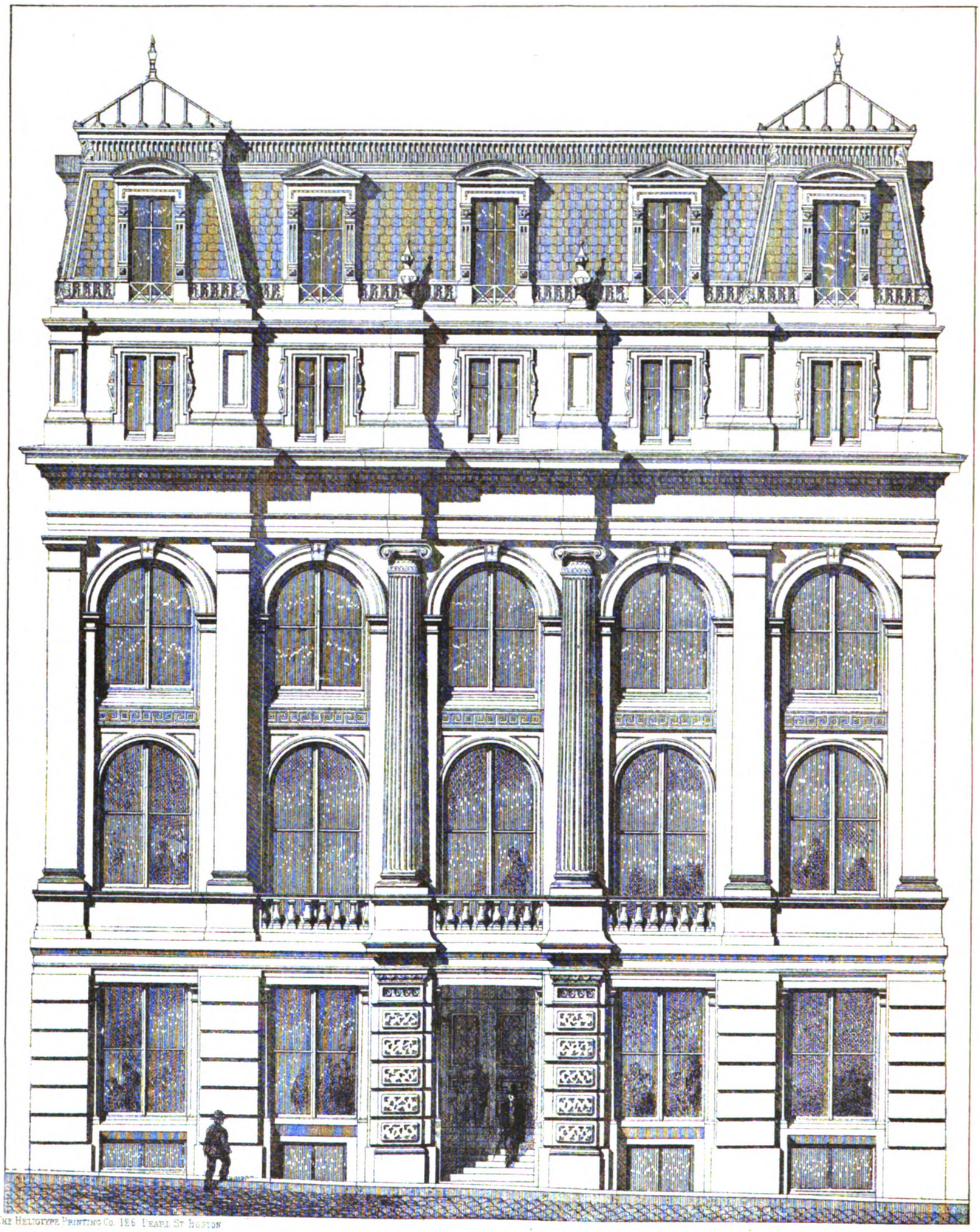

THE HELIOTYPE PRINTING CO. 126 PEARL ST. BOSTON

FACADE OF MERCHANTS BANK BOSTON

SCALE OF 1/8 INCH = 1 FOOT. GEORGE SNELL. ARCHT.

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St Mark's Church.
ISLIP. L.I.
Richard M. Hunt Architect.
NEW YORK.

PLAN

Scale of 10 feet.

Drawn for Heliotype by D.A.GREGG.

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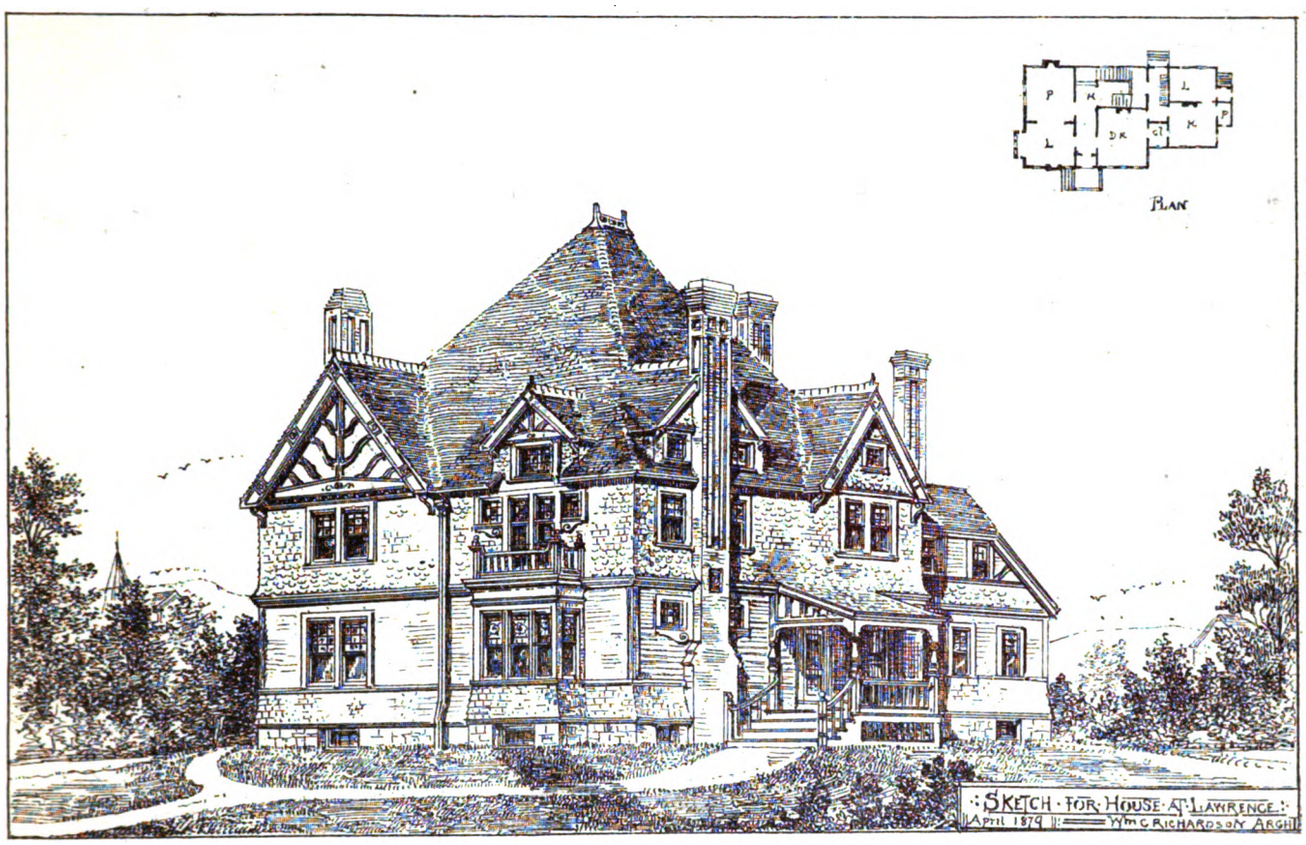

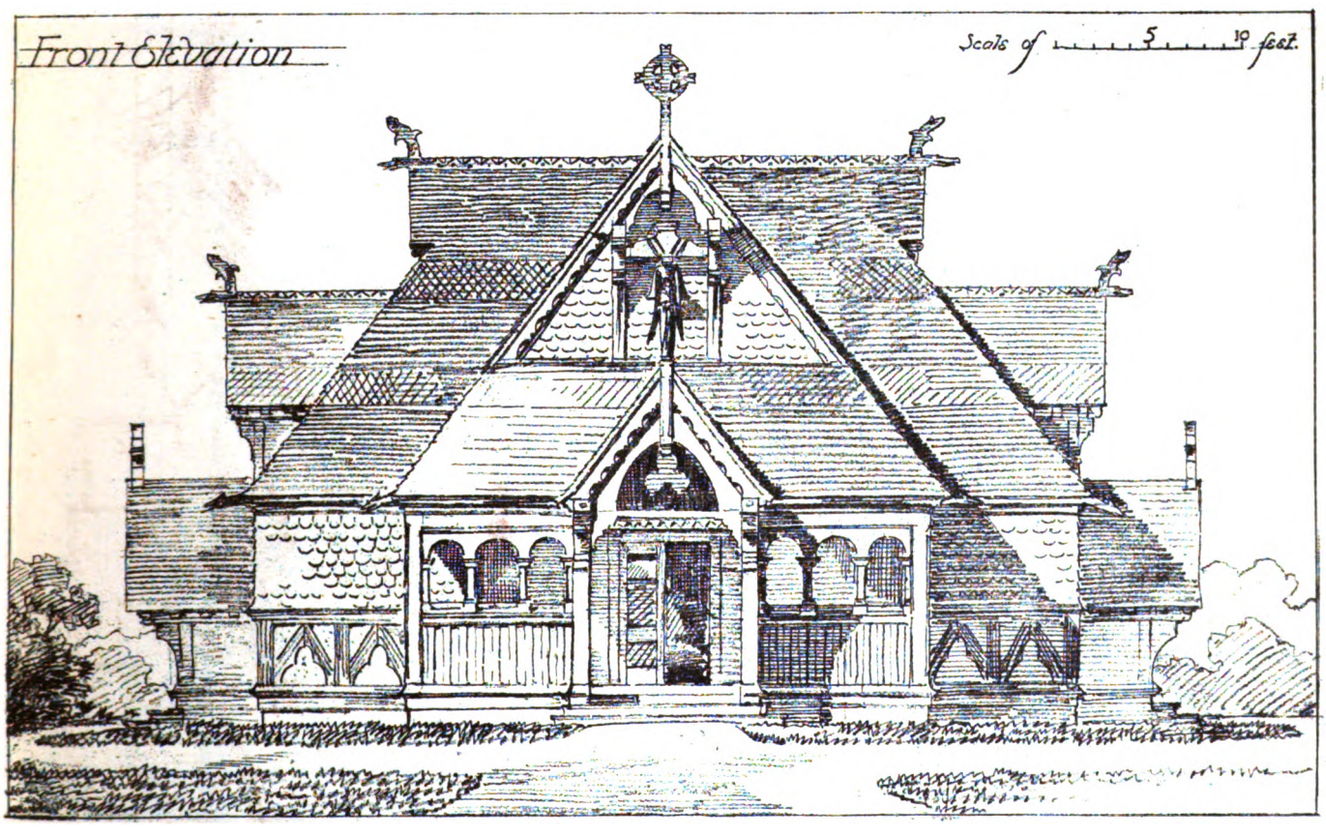

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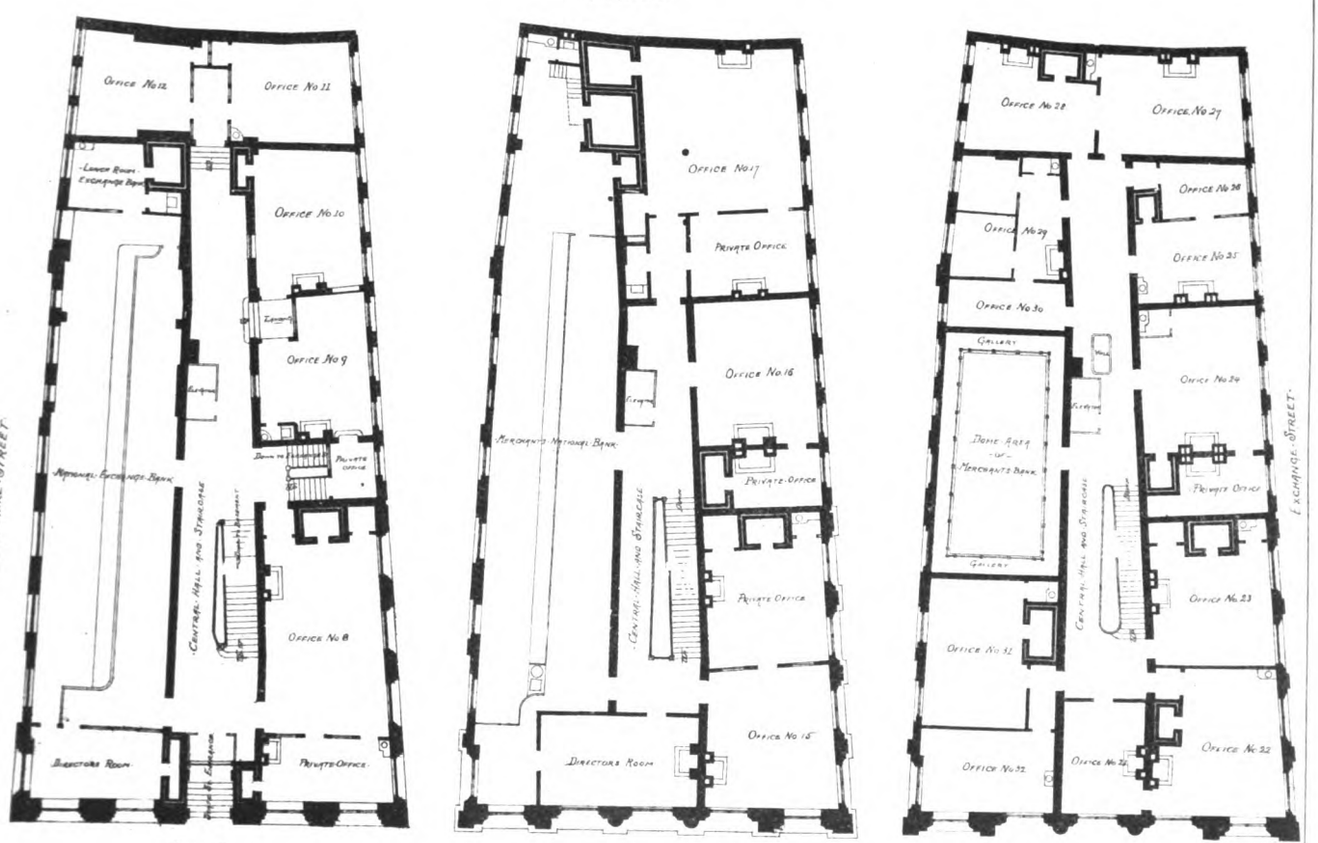
VERTICAL LONGITUDINAL SECTION OF MERCHANTS NATIONAL BANK BUILDING

GRIDLEY J.F. BRYANT, ARCHITECT

MERCHANTS NATIONAL BANK BUILDING

SCALE 1/8" = 1'-0"



FIRST FLOOR

BOSTON JAN. 1 1880

SECOND FLOOR

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New York on a short visit, and who has opened a temporary studio where a few of his decorative panels can be seen. In a very different scale of color from any of the artists we have mentioned above, his work is full of charming qualities, light and fresh in color as a May morning, carefully studied in arrangement, and of finished and extremely skilful execution; his panels (painted on canvas) are extremely pleasing; two in particular, destined to be placed in a double door, sliding on the face of the wall, are wonderfully well treated. In the one a bronze vessel; in the other a richly colored Majolica jar, made to hold a branch of light, graceful blossoms which stretches across the panel from top to bottom, the background in either case is a rich stuff — it is quite useless to attempt the description, for after all the charm lies not so much in what is done as in the manner in which it is done, the bright crisp scale of color and the skilful drawing and painting.

On the whole we feel that there is every reason to look forward to a brilliant future for all the many branches of decorative work; from the work at the Capitol at Albany down to matters of purely homely interest everything seems to feel the vivifying influence of true artistic thought and insight.

There are many croakers abroad who say that all this æsthetic house-decorating mania is nothing but a passing fashion, that people will tire of it as they tired of the French styles, so called, of twenty years ago, and of the Eastlake constructiveness of more recent date. But we believe that the present development is but in its infancy, and that it is based more nearly on true principles and is more in accord with our modern wants and cravings than any art "fashion" since the Renaissance, and that those who are creating it are in "dead earnest." There is, of course, both here and in England, an immense amount of meretricious work palmed off upon the public, and both here and there a large portion of the public lays itself open to ridicule by a superficial pretension to being "æsthetic;" but then, twenty years ago at least fifty per cent of this same public was absolutely apathetic on matters of taste. The direction and development of artistic thought was in the hands of a relatively small clique of artists and patrons. No wonder that the hundreds and thousands of persons upon whom the idea that it is "good form" to have taste are superficial and indiscriminate, and open to ridicule. There seems to us to be more hope in the fact that the public to whom an artist can appeal is so much larger, than there is discouragement in the fact that the public is still in its infancy as regards matters of æsthetic choice. B. W.

THE CONSOLIDATION OF THE SOUTH PASS JETTIES.

JUNE 17, 1875, the Mississippi jetties were begun. Their projector, Captain James B. Eads, was at that time comparatively unknown outside the profession of engineering, though his brilliant record as a government naval constructor during the war of the rebellion, and afterwards as builder of the great steel bridge at St. Louis, had already placed him well up on the ladder of professional fame. To-day he is known by his work, by perhaps a majority of the news-reading public.

By steady, hard, concentrated work and untiring energy, and in spite of many obstacles thrown in his way, not only by nature but by members of the profession, he has succeeded in producing even better results at the jetties than he claimed to be possible. As simple channel-makers the jetties may be considered as complete, but their consolidation, so as to guarantee their stability and economic maintenance, is an additional problem that Mr. Max E. Schmidt, C. E., presented, in the form of a carefully prepared paper, at the eleventh annual convention of the American Society of Civil Engineers, June 17, 1879. As he puts it, "strength being superlatively the original aim in the construction of sea works, *continuous* strength must be the essential for their permanency." Willow mattresses, loaded with stone, were used as the basis of the jetties, and it is to keep these from being displaced, or from leaking badly, and to prevent undermining and overflowing, that the consolidation is undertaken. McAdam-stone and gravel are used to fill interstices and prevent leakage. Rip-rap stone paving on the top of the mattress work and just above average flood-tide completes the work for the first eight thousand feet seaward on the east jetty, and nine thousand feet on the west jetty. The remainder of the distance to the outer extremity, on both sides, is being consolidated by the same arrangement of McAdam and gravel, with great blocks of concrete whose bases rest at average flood-tide level. The size and cross-section of this superstructure varies according to the location, being much heavier at the lowest end than farther up the river. Besides the concrete the lower six hundred feet are still further strengthened on the sea side by additional willow mattresses one hundred feet wide and two feet thick, over which a sloping crib-work of palmetto piles is laid, and the whole is kept in place by filling compartments between the piles with large stone. The river side is strengthened in the same manner without the willow mattresses; the palmetto crib being placed on top of the rip-rap. Large rock covers the crib-work and connects the same with the concrete. This work protects the concrete work from any directly injurious action from either sea or river. At the outside extremities of the two jetties pier heads are to be built at right angles to the axis, and in the form of a T-head.

The settlement and compression of the work differ greatly on different sections, — the former varying with the consistency of the bottom and the depredations of worms, the latter being probably nearly a constant quantity. Near the lower end, sixteen tiers of mattresses have been sunk, representing twenty-six and three quarters feet, of which eighteen and three quarters feet are below the original bottom of the bar. The depredations of the teredo are not such as to cause particular alarm, for there seems to be no special reason for believing that any portions of the willow, other than what are directly exposed to the salt water, are injured by them.

Some two years ago numerous large stones, varying in weight from one to two tons each, were placed at the centres of the jetties, near their lower ends, but as they were lifted from their position and rolled over the jetty by the waves during a gale, it was determined that something more massive than quarried stone must be resorted to. Plans, therefore, were made, providing for blocks of cement concrete varying in weight from twenty-five tons to seventy-two tons each, their proportions and dimensions being so chosen as to give great stability, and render it impossible to upset them. The works at the Sulina mouth of the Danube, and at Port Said, the terminus of the Suez Canal, are being consolidated in this manner, but the largest blocks of concrete, of which record is made, seem to be those at Cherbourg, weighing forty-four tons. At South Pass a railroad track is laid on each jetty, furnished with a locomotive, and a dump car holding about two cubic yards, to facilitate matters, and the concrete is mixed by steam power.

The composition of the concrete is approximately as follows: forty per cent broken stone; sixteen per cent clean gravel; twenty-eight per cent sand; sixteen per cent cement.

The broken stone, or McAdam, is hand broken, and small enough to pass through a three-inch ring. The gravel is brought from Prophet's Island, near Baton Rouge, La., some two hundred and fifty miles, and the particles are from one thirtieth of an inch to two and one half inches in diameter. The sand, excavated from the islands in Mississippi Sound, near the mouth of Pearl River, Miss., is moderately coarse (one fortieth per cent diameter), and a sharp-grained, white, or pale yellow material. Saylor's American Portland Cement (slow-setting) is used to make the bond, over five thousand barrels of three hundred and eighty pounds each having been used up to June, 1879. The cement seems to give good satisfaction, for Captain Eads says: "The careful tests which have been made with it by the resident engineer, Mr. Corthell, and his assistants, justify me in saying that I believe it to be fully equal to the best English brands." It may be said that these tests, five hundred and eighty-three in number, give an average tensile strength of two hundred and seventy-eight and three tenths pounds, as against three hundred and fifty-five pounds, Liverpool corporation test, for the best English Portland Cement. The ingredients are mixed with fresh water, in quantity equal to about ten and one half per cent of the volume of the dry material.

The moulds in which the concrete is formed are made of thin flooring, held in place by stanchions, the whole being wedged and dovetailed so as to stand temporarily without nails. The moulds are pushed close to the finished blocks above, so as to have joints as small as possible. After the removal of the moulds, irregular places and holes are plastered by the masons.

Apparently the blocks settle within the first ten days of their construction and then remain nearly stationary for an indefinite period. Whether there may be any considerable settlement in the future it is too early now to tell, but thus far an average of from four tenths to eighty six-hundredths of a foot will represent the subsidence due to the weight of the superimposed concrete blocks. B.

W. M. HUNT'S INFLUENCE ON PAINTING.

IT is not surprising that some of the enthusiastic young artists who have recently imported foreign styles from the ateliers of Paris and Munich into American art should be fanatic on the question of *technique*. They have a mission to perform, they are teaching us the importance of technical knowledge in art, and all such men must be more or less fanatics; but while they are indispensable to the art of the future, their admirers are not obliged to be fanatical as well; dogmatism has no place in such questions, and they should remember that mastery in style is simply a means, and not an end, — in skilful hands a weapon, but not the deed for which the weapon was made, — while styles that are to give immortality to our artists will not be borrowed, but indigenous. This period of our art, so far as painting is concerned, began several years before its drift was strongly perceptible, quietly and unostentatiously. Some fifteen years ago the Boston correspondents of the New York press began to allude to the art school and work of Mr. William M. Hunt. He had already been for some time a rising power, and was until his recent untimely death the most considerable individuality in contemporary American art. At the same time his career most thoroughly illustrates the truth of the foregoing reflections. Mr. Hunt has been an influence among us, not so much because of the originality of his art as on account of the force of his personal character, which, in a city where personality has a charm unusual in the United States, conveyed the impression of genius, and gave weight to whatever he said and did, and collected around him a circle of admirers who were bound in tacit league to fight his battles, too often with a zeal that was liable to be unjust in the consideration of other artists and schools.

Another reason for the remarkable influence Mr. Hunt has ex-

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erted is owing to the fact that when the hour had arrived for a new period in our art, the first step in that direction was taken by him. We refer to the question of *technique*. Whether consciously or not, Mr. Hunt seems to have been the first to make the deliberate attempt to import foreign methods into our art. Not that he was the first of our painters to study abroad and to imitate foreign styles, for, from the time of West to our day, many of our artists have done the same. But their power has been less, or they have soon emancipated themselves from foreign influence, and formed styles of their own, or the time was not yet ripe for so distinct a recognition in this country of the importance of technical excellence. Mr. Hunt had the good fortune to introduce here the methods of one of the greatest masters of modern times, Jean François Millet. The superb style of that artist Mr. Hunt could reproduce for us, as he did, in numerous excellent portraits and compositions, and repeat some of his maxims; but the soul of the art of Millet cannot be imitated here until men as originally great as he are born among us. Still, we undoubtedly owe a debt of gratitude to Mr. Hunt for starting a movement of such importance in America, even if style be only a means to an end, although what an indispensable means!

The conditions for the success of Mr. Hunt's undertaking could have been found nowhere else in America at that time so well as in Boston. Compact, strongly swayed by the *esprit de corps* of cliques, intensely self-appreciative, and until quite lately homogeneous in population, this city has always loyally stood up for the opinions of the heroes it adopts. Therefore we say no better place could have been found in America wherein to start a new æsthetic movement.

Mr. Hunt's influence has been apparent in two ways, of which one has been to gather around him a flock of enthusiastic admirers, who have faithfully imitated the style of Millet at second hand, as suggested through the works of their leader. They have thus played an imporant part; and if none of them have been geniuses, — for genius rarely condescends to imitate, especially at second hand, but is bound to assert itself in original creations, — they have at least done good service in publishing the gospel of style. Mr. Hunt's influence has been also evident in stimulating a crowd of art students to cross the Atlantic to study the *technique* of modern European art in its strongholds. We think we are not mistaken in attributing one of the most noticeable phenomena of our contemporary art to his example and his precepts.

But if Boston was the place in which the new era could best make a beginning, we must frankly admit that in New York — more cosmopolitan and catholic in its views on all questions than Boston — this period of our art seems destined to find a more congenial field for its growth and development. Until the advent of Mr. Duveneck from Munich, and the active efforts exerted to gain for his paintings the recognition of the leaders of the Boston art-circles, it was nearly impossible for any but modern French art, or the imitation of it, to gain a foothold in certain circles of that city, while in New York we see the graduates of the studios of Paris and London, Munich and Rome, finding ample scope for their methods, and actually working together for the establishment of art schools and exhibitions that should give expression to their respective views. If too intolerant of the good work our artists have formerly produced, they have at least enjoyed and practised a certain degree of charity towards each other which can afford to be enlarged as they become surer of their ground. Intolerance in the consideration of art questions is the most common of all the forms of that evil, while it is never more offensive, when one considers the infinite number of truths in nature that may be and are to be revealed by art, and the fact that it is only as artists see and interpret those truths in their own way that they can possibly add anything of really permanent value to the intellectual progress and happiness of mankind. — *S. G. W. Benjamin in the American Art Review.*

THE FALL OF THE TAY BRIDGE.

The first point ascertained by the discovery by the divers of a part of the wreck of the train is, that the bridge did not fall before the moment when the train was upon the portion that fell. If so, the idea of an independent destruction of the bridge by the gale, and of the leap of the engine and train into the chasm, must be definitely abandoned. Next, it is in evidence that the train was proceeding at a foot pace of three miles or thereabouts per hour. The theory of a violent concussion of the engine against the girder must, therefore, be given up. It would be too much to declare it impossible for the train to have left the rails (provided as they were with guards) at that speed; but it is extremely improbable that such was the case. We have thus to regard the girders that gave way as supporting a slowly moving weight of some 80 or 100 tons, distributed over about the length of one span of the bridge. As far as the weight is concerned, this would have added to the stability of the bridge, unless so considerable an amount of oscillation had been set up as would have passed the limit of safety were the bridge unloaded. We are thus led to regard the bad effect of the train on the bridge as mainly limited to the addition of a surface of some 2,000 to 2,500 feet to the resisting area of one or two girders at a time.

The actual shock caused to either unloaded or loaded girder by the fury of the storm is less easy to estimate. A pressure of fifty-five pounds per square foot is said, in Knight's Encyclopædia of Engineering, to have been actually registered at Glasgow Observatory. But the measurement of pressure is one thing, and the exceptional fury of a pulsating gust up a funnel like that afforded by a river valley is another. We will not attempt at the moment to estimate the maximum pressure. But we shall probably be within the mark in taking a minimum force of forty-five pounds per square foot. The area exposed by the girders is given at 7,615 superficial feet. But as this is not plain surface, but iron net-work or lattice, a large deduction must be made from that sum. On the other hand, the wind that rushed through one interval might strike another bar of the girder. If we allow one third of the exposed area to be resisting surface, we shall have again in round numbers 2,500 superficial feet. On this estimate the presence of the train on the bridge just about doubled the resistance offered to the wind; or, in other words, halved the resisting power of the bridge. And the lateral force to which a girder, or an equivalent length out of two continuous girders, was exposed, was more than 100 tons, acting as laterally displacing pressure. Keeping still to round figures, which it will be easy to correct if necessary, we find that the train had arrived at a point between the fourth and fifth piers when the collapse occurred. This is shown by the position of the wreck. The width of the piers was twenty-seven feet, and the width between the centres of the iron columns which stood on them was of course less. The height from the water to the rails is given at ninety-two feet, and above this was the thickness of the roadway and the depth of the girder. It follows that the effect of the force of the wind to tip the structure sideways was resisted by only three elements of stability. Of these one was the continuity of the girder; one was the weight of the bridge; the third was the disposition made to tie down the superstructure to the earth, so as to check a disposition to tip over.

The value of the first of these elements may hereafter be calculated; the second may be taken at under 400 tons for the span of bridge and train. The resistance would be exactly balanced by such a force as we have above estimated, — namely, a lateral pressure of 100 tons, acting with a leverage of four to one, directed to pull up the windward columns supporting the girder, the base of the leeward columns acting as a fulcrum. In this case the stability of the bridge would have depended solely on the continuity of the side girders, and on the provision for holding down the girders to the earth. This latter provision, however, seems to have been omitted. It may, of course, prove that such was not the case; but no mention is made of holding-down bolts. Had an iron plate been built at the bottom of each cylinder, with bolts of adequate diameter keyed below it, and brought up through the concrete and masonry, to tie the superstructure and prevent a sidelong tipping over on its narrow base, the bridge in all probability would have been safe. Now we are told that "the sixth pier had been neatly cut across as by a knife, only a small piece of the lower portion of the iron columns remained on the masonry, which had been started, and showed cracks in several places." "The fifth pier showed signs of a terrific wrench; the top coping-stone was literally cracked and torn to pieces. The iron columns lay like so many matches." Here, then, we see the point of yielding. The "clean cut" on the sixth pier must have been due to the "way" on the yielding girder by the time the motion reached that spot, the splintered work on the fifth pier betraying the struggle where the structure first yielded. Thus the point of yielding was the attachment of the iron-work to the piers — strong and substantial, no doubt, if regarded as intended to resist weight and vibration, but, so far as the accounts go, not secured in such a manner to the bottom of the masonry as to bind all together in one homogeneous structure and offer an adequate resistance to lateral displacement. —*Pall Mall Gazette.*

PAINTING AND STUCCO IN ANCIENT ROME.

The discovery of the Augustan house on the Tiber shore revives the old interest that was felt in Pompeian pictures, and the delight we all of us took twenty years ago in the painted tombs on the Via Latina when they were discovered, and we saw for the first time mural decorations far superior to the Pompeian pictures and *stucchi* ornaments. It sharpens our curiosity about ancient artists and their mode of work. We are eager to read every author who writes about them, and there is an exquisite gratification caused by modern artistic representations of incidents in ancient art lives when painted, as Scifoni paints, with skill, feeling, and accurate archæological knowledge. Some of the *'freschi* are already mounted in frames and hung in the old plant-house of the Orto Botanico, Trastevere, where is to be established the Tiber Museum. When the *stucchi* are mounted on their curved plaster backgrounds they will also be placed in this Tiber Museum.

The museum will be thrown open to the public, it is hoped, this season. But the work of putting the pieces together is very tedious, and may occupy the whole winter. It is a strange old place, those cloisters. There are marble fragments in the court-yard that have come from every quarter of Rome. Under the cloisters and in the surrounding rooms busy, skilful workmen are sorting from the great heaps of precious *'freschi* and *stucchi* the bits they need to reconstruct the ruined decorations. Nothing is repaired; nothing added. You will see when they are exposed to view only that which was left in the ancient house of its former splendor. On one of the cloister walls is a marble inscription which tells us that where Hadrian, the

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Roman Emperor, built a temple to Venus, there Alessandro Torlonia, a Roman prince, raised an altar to the Holy Mother of Christ Jesus. The temple and altar are alike gone. The *'freschi* have been covered with a varnish of wax and turpentine which preserves them and also freshens the color. These pictures seem to have been painted upon some one local color. The foundation was first covered with a smooth red, black, or white ground. The figures or scenes were then painted upon this foundation. You can see where the colors of the pictures have fallen off, the red, white, or black of the foundation existing, polished and unfaded. Pliny and other writers tell us how ancient paintings were executed, but all they say fails to make moderns comprehend the processes.

The *stucchi* which I described imperfectly last year I have examined more closely, and have been able to see some details of their workmanship. They were not cast and put on as modern decorations of the kind are done, but modelled on the ceiling surface. The designs were first traced on the hard ground. Where some of the stucco has fallen away you can see the bold, free lines of the first original design. The pictures, or figures, were then modelled on. The stucco that was used, it was supposed by some learned in the matter, was composed of marble dust and calcelime, but this is not certain. Judging from the work on these ceilings of the Tiber house, also the exquisite work on the painted tower of the Via Latina, the skilful ancient *stucchi* artists must have handled their material as freely as painters do their liquid colors, and used their modelling tools like painter's brushes. You can see the touches of the tools in many of the figures. There is the fine feeling of the bas-relief in all the work, — that feeling in sculptural art so little understood in modern work.

There is no color in the *stucchi* of the Tiber house. On one of the painted tombs in the Via Latina are pictures united with *stucchi* and colored background, but not so in the Tiber house. They are pure white on a white ground. These curved ceilings were very low; not more than two metres and a half high, a little over the height of a man. The rich vivid colors of the walls rose up to the ceiling frieze. There were no windows, and the light that came through the doors must have thrown deliciously soft reflections of mingled hues upon the delicately modelled bas-reliefs of the ceiling. They represent various subjects: religious ceremonies, nymphs decorating hermes — on which are sylvan gods — with garlands, or lighting flames on altars. Then there are exquisite arabesques, so graceful that we wish Raphael and Giovanni da Udine could have seen them. There are crisp, firmly modelled flowers, fertile and original, as we see on the Renaissance marbles, and out of the calyxes arise warriors, winged griffins with Jupiter heads, and winged victories. It is impossible to repeat the varied fancies of these decorations, where the modelling tool seemed to play like a pencil or a brush on the surface. I picked up a piece of plaster on which was a beautiful square or rosette formed of a lotus flower and cigali. On each lotus petal was a grasshopper with extended wings. Some *stucchi*-workers are making a bath-room at the Quirinal Palace, for Queen Margherita, with *stucchi* decorations copied from these of the Tiber house, but they are cast, of course, not modelled. — *Rome Correspondent of Boston Daily Advertiser.*

THE UNCERTAINTY OF INSURANCE.

EIGHTY-THREE New York companies, tabulated by the Superintendent of Insurance of New York, disclose the following facts: That their expenses had been fifty per cent of their premiums, and their losses seventy per cent. There is no such thing as any insurance that is not mutual, and there cannot be in the nature of things. What is it on which each man depends who takes a policy of insurance in a stock company? He depends upon the aggregate premiums for his indemnity and upon the maintenance of the capital, which is merely a guarantee, standing in the place of those obligations of what are called mutual companies. Now the whole business, credit, traffic, and standing of this country depend upon the integrity of insurance, and upon its being maintained fully, amply, creditably, and rightly, paying the indemnity, which is what the assured seek when they pay their premiums; therefore, in place of the absence of any direct relation between the insurance companies of the land and the architects and builders of the land, there should have existed the very closest relations, the closest supervision of the construction, use, and occupation of every building. Now, why does it not exist, and why is it not in the power of the able presidents and executive officers of the stock insurance companies — and there are many such — to bring it into existence? I think I find the reason where it might least be expected, in the special supervision by the States of the contract of insurance. Now, the effect of that is, perhaps, very remote and subtle, but the authority of the State being its guaranty, it is generally thought that any company doing business within its borders is fit to take risks. Now, a great many of those companies that are thus authorized are not fit, and a great many agents and officers representing those companies are not competent; they are utterly incompetent, seeking more for the large commissions that are paid than for any adequate standard of safety. I hold that the first step to remedy this enormous loss which affects us is for the State to take its hand off, and then it will be possible for the managers of the strong and competent insurance companies to impose the same conditions and to make it for the common interest of the assured that they should impose the same conditions that the presidents of the mutual companies are able to impose upon their members, by simply advising them to construct their factories in such a way, to protect their factories in such a way, under the penalty that if you don't do it we will not insure you. — *Mr. Atkinson before the Society of Arts.*

HYDRANTS IN THE HOUSE-TOPS.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — There are three suggestions in your paper of February 7 that I think would not have been made had the relation of the architect and underwriter been as close as it should be.

1st. In your editorial comments upon the suggested plan of roof-pipes and hydrants, you suggest a doubt whether water will pass freely through a cold iron pipe.

There is no room for doubt upon this point, as there is ample experience upon it.

2d. You suggest a difficulty in keeping the apparatus in order.

One hour an acre, once a month, would suffice, in the estimation of competent experts.

3d. Your correspondent, whose article on elevators is otherwise excellent, adheres to the theory of heavy, cumbrous, and useless *iron* doors.

Elevator shafts, as now commonly constructed, are nothing but flues of the most dangerous sort, and give evidence of the complete mastery that has been obtained in the art of combustible construction. There is not one known to the undersigned that could not be made substantially safe at a very small cost, but, in prescribing the right method, iron doors would be carefully avoided. E. A.

[That water will flow continuously through a cold iron pipe, when a circulation is once established, we know. We should think, however, that there must be a limit to the distance to which water could be injected into an empty circuit of very cold iron pipes, of small diameter, without being caught by the frost; and, of course, exposed pipes could not be kept full of water where there was no circulation. Running water freezes with difficulty, but it freezes. Even a waterfall in very cold weather gets covered with a sheet of ice. A full iron pipe at zero would probably soon have a lining of ice. In a long pipe of only four inches diameter there would be danger that this lining would get thick enough to seriously diminish the bore, and lessen the flow. We have no idea what the practical limit would be; but should say that in a long and complicated circuit with turns, branches, gates, and dead ends, the danger of choking was to be taken into consideration. It would be easy to send water through a rod of such piping, but probably not through a mile. Somewhere between we should expect to find a limit. If E. A. knows of examples which are decisive in this respect it would be interesting to hear of them. As for the supervision, of course it would be practicable; the only danger is of neglecting it, which certainly is not necessary. As we said before, we should be glad to see the scheme tried. — EDS. AMERICAN ARCHITECT.]

PUBLICATIONS RECEIVED.

ILLUSTRATIONS OF THE HISTORY OF ART. Part IV. The Industrial Arts among the Oriental Nations and the Nations of Europe, from the Middle Ages down to Modern Times. 42 plates. Boston: L. Prang & Co. 1879. Price $1.75.

NOTES AND CLIPPINGS.

LOSS BY FIRE IN NEW YORK. — Fire Marshal Sheldon reports that the 1,541 fires of 1879 in New York destroyed property valued at $5,671,580. The annual fire loss of the United States is presumed to average nearly $100,000,000, so that the metropolis bears more than one twentieth of the nation's entire fire loss for the year. In the face of these statistics architects complain that real estate owners will not pay for fire-proof construction and there are very few buildings being erected with any safeguards. The blame is generally thrown on the insurance companies' rates, but owners should take into serious consideration that the $900,280 loss on buildings burned in 1879 and the $4,771,300 on the contents of those buildings is so much wasted wealth, and that it is their duty to do what lies in their power to prevent such serious drawbacks to the prosperity of the city.

COAL OIL AT FIRES. — Chief Engineer Sexton, of the St. Louis Fire Department, being asked by a newspaper reporter of that city what he considered the chief causes of fire, replied: "As for the fellows who set their places on fire to get the insurance, we can't prevent it; all we can do is to squelch the blaze when it is lighted; but I'm paralyzed on coal oil. I am more afraid of it than powder; it is more dangerous to life and property. No kind of inflammable oil is safe. Places have caught on fire by gas, but it has been through intention or carelessness. I would go back to star candles before I would use any of the oils, I don't care what name they call 'em. They are the fireman's fear. If people had seen the suffering of dead women and children, victims of coal oil, that I 've seen, they 'd drop it. It 's a misfortune that it was ever discovered or brought into use for illuminating or heating purposes." He also stated that the records of the fires in St. Louis show that in that single city some thirty-two fires have been caused by coal or other oils during the present year.

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Driven Wells. — The *Fireman's Journal* gives the following account of a set of driven wells that have proved very efficient in supplementing the regular water supply in Manchester, Iowa. "A pit four and one half feet deep was dug in the form of a cross having equal arms, each arm extending eight feet from the common centre. At the centre was put down one pipe and at the extremity of each arm another, making five in all, the outer ones being eight feet from the centre. The terminations of the pipes, or points, were two inches in diameter, with two hundred and fifty holes in each. The average depth to which the points were driven was twenty-one feet below the bottom of the pit. The five pipes are brought together at the centre, discharging through a pipe of the same size as the suction of the steamer. At the first trial some little delay was experienced, owing to the difficulty of making the connections air-tight, but this defect was soon remedied and a full stream of water was thrown through one thousand feet of hose. The wind was blowing a gale at the time and the draught in the furnace was so great that water could not be kept in the boiler, so the trial was abandoned after about twenty minutes' playing. The question remained whether the supply was exhaustible, but this was subsequently determined in the negative by a test of two hours' duration, the water coming as copiously at the end of the trial as at the beginning."

The Elephantano Cave. — The island of Elephantano is nearly a mile long, thickly covered with forest trees, principally palms and tamarinds. The appearance of the island is singular, having two peaks, each several hundred feet high. The cave is located in the valley between the peaks, nearly half way up the hill, being about a half mile from the landing. Formerly the traveller was carried from the boat to the shore by the natives, the water being very shallow near the island, but now there is a little pier, on which we landed and walked to the shore. A cut-stone stairway leads up the hill to the Temple. The stairs are a stupendous work, and the steps are well worn by the feet of the millions of pilgrims and worshippers at these celebrated Cave Temples. The front of the Temple is open now, but there are indications that there was an entrance in which there may have been solid doors; but the early descriptions of this Temple are silent upon the subject. The place, with the surrounding scenery, is truly romantic. The magnificent tropical trees and brilliant wild vines all contribute to form a scene of peculiar interest. The Temple is about twenty feet high, and, being all open, is as light as day, and every part can be seen without the aid of artificial light. The great room in this Temple is one hundred and thirty-three feet by one hundred and thirty. There are several apartments, but all communicate with each other. The rocky roof is sustained by immense fluted pillars with ornamental capitals, that somewhat resemble poppy plants, of many designs, and all hewn out of the solid stone. The principal piece of statuary is the Trimurti, or Trinity, which stands opposite the principal entrance. These colossal figures stand twelve feet high, and are at once grand and imposing. The three heads are supposed to represent the Hindoo Trinity. The most prominent head represents Brahma, the Creator of all things. The features are pleasing and calm, with an indication of serene repose. Vishnu, upon one side, has a mild and benignant expression. The figure has been injured and sadly mutilated. In one hand there is a lotus blossom. On the other side there stands Shiva, with an expression so fierce, showing teeth so threatening, that he well represents the Destroyer. Shiva holds in one hand a cobra with expanded hood, and waiting for a chance to strike the blow that is sure to carry death to the victims. It was a sculptor of rare merit that designed and executed these heads in this hard rock. They are quite unlike, but you cannot fail to discover the design of the sculptor in making these figures. The same figures are repeated in different parts of these strange temples, and are so similar that you cannot fail to see the symbol, but none of the other statues are so impressive as the Trinity. There are smaller rooms in this temple, the columns and walls of which have very curious sculptures. These curious figures have received adoration for many centuries, and until quite recently a large number of pilgrims and worshippers came hither to make their offerings, and to worship. While some of the figures in this Cave Temple are well executed and may claim merit as works of art, yet many of the statues here are, to say the least, crude symbols, and so very inferior that I cannot understand how any one could have worshipped them, but they did. There is a stone, or statue, which is symbolic of the Lingam, which is the most ancient of all the Hindoo symbols. This one in past years was of very great repute, and considered quite efficacious as a cure for barrenness. — *The American Antiquarian.*

Buried Oak Timber. — In deepening a river in the neighborhood of Norrköping, says the *Timber Trades Journal*, in order to make it accessible for ships of heavier draught, among several objects of interest brought up from the bottom, eight oak trees were found at a depth of seven feet under the old bottom. The bark was almost decayed, and when it was taken off the wood was found to be hard and black, resembling ebony. The trees are supposed to have been lying in the earth 900 years. The trees have been sold to a firm of joiners, who intend using them for cabinet work.

Telegraph Wires and Fire Insurance. — The Chicago insurance companies are talking about increasing the rates on buildings that are surrounded by telegraph wires.

The Pergamos Marbles. — The latest attractions in Berlin are the Pergamos marbles, which, by a piece of finesse worthy of the *Tartuffe* of nations, have just been brought from Asia Minor, and deposited in the museum under the care of Professor Curtis. A Prussian engineer, it appears, found traces of sculpture in certain old walls near Pergamos, which the Turks had plastered with mud and lime. He informed his Government of the fact, and they, after due investigation, purchased the walls for about £2,000. A gun-boat was then quietly sent to bring the works of art which they contained to a German port, while the world was wondering why Germany should appear in the East to intimidate the Turks with a vessel of war. The most remarkable part of the collection are sculptures in relief representing a battle of the gods, and which it is supposed formed part of a gigantic altar. Owing to the fact that the Turks utilized these marbles under a covering of plaster, they are in excellent preservation. — *The Examiner.*

Ancient Flemish Churches. — In the old Flemish town of Oudenard stands an edifice remarkable for its style and its antiquity, — the Church of Notre Dame de Pamele. An inscription mentions the date of the commencement of the building, the 4th Ides of March, 1234, and the name of the architect, Arnoulphe de Binche. It was completed in 1838. The church of Pamele, the most unique of its kind in Belgium, is most interesting for the study of the early period of Gothic art. Built in the form of a Latin cross, it is 155 feet long and 56 feet wide, and of equal height under the central nave. The transept is 100 feet long. At the intersection of the arms of the cross rises an octagonal tower, with a pyramidal roof. The choir, with a pentagonal apse, is surrounded with numerous bays, and a triforium of majestic simplicity completes this gem of architecture on the eastern side. The transepts, and especially the nave, although constructed at nearly the same period as the choir, are less graceful, but they have similar grandeur on the whole. Notre Dame de Pamele, so interesting on many accounts, has suffered great injuries. Time and the Scheldt, close to it, had exercised their ravages on it. Already a century ago it was considered in so bad a state that its restoration was looked upon as useless or even impossible. Then it was daubed over inside with plaster, its beautiful columns were transformed into hideous square pillars, its pointed windows changed into circular ones, and an enormous cornice destroyed the light, elevated aspect of the building; the triforium and the windows were partially stopped up, the roof modified, and whitewash appeared everywhere. In short, the monument so throughly lost its original character that Schayes was deceived, and took the pillars and circular windows of the choir for authentic. At present, opinion is changed, and the restoration and consolidation of the church is not considered impossible, and the work has been going on for a year with great activity. It has been confided to M. Van Asshe, who understands restoration in its true sense. Full of respect for the work of his predecessor of the thirteenth century, he is endeavoring to re-establish it such as it left the hands of Arnoulphe de Binche. The choir has already resumed its primitive aspect, and the rest of the church is progressing rapidly in the same direction. — *Exchange.*

Mines in Prussia. — The estimated receipts for the produce of the coal, metallic, and salt mines belonging to the Prussian Government for the next fiscal year are, as appears from a recent debate, 48,198,148 marks, or rather more than $12,000,000. Considerable complaint was made by some members in the recent debate at the fact that the salt mines, on which 4,500,000 marks, or $1,125,000, had been expended during the past ten years, produced this year only the miserable sum of 98,000 marks, or $24,500, the capitalized value of the salt mines being estimated at $3,750,000. In reference to the upper Silesian coal mines, it was stated that women were still largely employed there, the number at the last enumeration being about 5,500, most of whom were young Polish women and girls.

Tillamook Rock Lighthouse. — The *Oregonian* gives some new items regarding this enterprise, so long deemed impracticable. It says: Tillamook rises from the ocean one and one eighth miles from the mainland, twenty miles south of the Columbia River, which is the harbor nearest it, and therefore practically twenty miles from land. Its height is about 100 feet above the water line, from whence it tapers slightly, terminating in a crest about 130 feet across. It was proposed to cut down this rock to a point where it is wide enough to form the base of the proposed building; and determined that the success or failure of this preliminary effort would establish the practicability of the project or prove the reverse. The terrific dashing of the waves against the rock renders landing alongside impossible, and it was only under the most favorable conditions of weather and at imminent peril that a man bearing a small line was enabled to reach it. This small line drew a larger, and this one still a larger, which, being secured, formed a swinging connection for a netting in which men, supplies, tools, etc. were landed from a tender. Then men, under the foremanship of Mr. Ballyntine of this city, have been at work for several weeks, and besides having accomplished a goodly part of the object of their labors have demonstrated that men can live in comfort on the rock, and that Colonel Gillespie's plans are practicable. The lighthouse which will be erected will be of the first-class order and manned by a keeper and three assistants. The rules under which these persons must be selected demand that they be masters of mechanical trades, the special qualifications of each differing from the others. Attached to the light will be a "siren," or steam fog trumpet of the latest and largest style. The station will be visited frequently by a tender with supplies, though during boisterous weather it will be impossible to communicate with it excepting by signals. The establishment will be completed, if no special misfortune occurs, by the first of December next year.

A Russian Ice House. — A house of ice, similar to that which was built in the Empress Anne's reign, is about to be constructed in the Zoölogical Garden at Moscow. The managers of that establishment have found among its archives some valuable details as to the mode of building which was adopted on the former occasion, and they will be adhered to in the present instance. The first edifice was raised between the Admiralty and the Winter Palace at St. Petersburg, in 1740, and was formed throughout — walls, roof, windows, decorations, alike — of ice. The blocks were cut in a square shape and their surfaces sprinkled with water, which, when the cubes were placed in juxtaposition, froze in the interstices and bound the whole into one compact and solid mass. At the entrance of the structure was a large gallery filled with statues. The pilasters on the exterior were fashioned to imitate green marbles. The antechamber possessed four windows and the other rooms five each, while on the sills stood vases filled with flowers made of ice, shrub-like plants covered with birds of the same material standing at the corners. Clock cases, chairs, tables, wardrobes, utensils, candelabras, beds, were all of ice. — *Exchange.*

Maps of Paris. — The reproduction of the old maps of Paris, beginning from a very early epoch, is now being proceeded with by direction of the municipal authorities. These fac-similes are being effected by means of the most perfect processes of photographic engraving, and the collection is likely to prove most interesting as well from an artistic as from a historical point of view. Among the maps to be copied figures that called the "Plan de Tapisserie," which was worked by ladies of the court.

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BUILDING INTELLIGENCE.

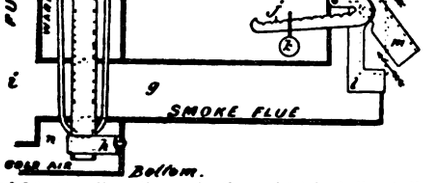
[Reported for the American Architect and Building News.

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors gently desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

221,497. FURNACE-REGULATOR. — Charles H. White, Malden, Mass. The combustion chamber of the furnace is represented by the space marked *i*. The smoke-flue is marked *g*. The air-heating chamber, with cold air admitted at the base, is marked *n n n n*. In this air-heating space is a vertical iron flue, *a*, which, when heated, expands less than brass. This flue has its lower part in the base of the air-space *n*, where it comes in contact with and is surrounded by the cold air, near its entrance into the furnace. The upper end extends entirely up through the column of air, and has its upper portion in the hot air at the top. On the top of *a* is formed a seat for the fulcrum of the lever *d*. This lever *d* has a seat on each end, one for the fulcrum of the lever *e*, the other for the fulcrum attached to the part *b* of rod or rods *b c*. The lever *e* has another seat bearing the fulcrum or knife-edge attached to part *c* of the rod or rods *b c*. The rods *b c* are in one piece, as shown, forming a loop at the lower end. They take hold of the cold-air flue *a* near the bottom in the cold-air space, and both are supported by the stand *h*. A rod, *f*, takes hold of the long arm of the lever *e*, and is connected to the short arm of the graduated lever *j*, both arms of which extend from the pivot of the regulating-valve *m* in a similar direction, so that their



Bottom.

weight, as well as the graduating-weight *k*, shall act directly to turn the valve *m* when permitted by the expansion of the rods *b c*, which allows the lever *e* to droop. Great advantage is gained by attaching *j* directly to the valve, so that its action is immediate and not through other connections. The valve *m* is partly cylindrical, by which means its pivots are brought toward the middle of the smoke-flue, and its upper portion made to fall across and nearly close the passage in the smoke-flue with a small movement of the valve, the curved form always insuring the proper opening or passage-way to carry off the gas. The lower end, at the same time, gives advantageous form to the lower inlet of air. The lever *j* is graduated and carries an adjustable weight, *k*. The valve *m* has a peculiar action in admitting air to the smoke-flue to check the draught, so checking the combustion and reducing the heat. It not only admits by its upper end a flow of air to supply the draught in the usual way, but also furnishes by the action of its lower end a supply of air back of the check part of the valve, so as to counteract a certain tendency which even the inflowing air has to draw other air and products of combustion through the partly-closed opening or passage in the smoke pipe, whereby a most perfect action is secured. Another peculiarity is that the bearings which support the pivots of the valve *m* are attached outside of the smoke-flue or entirely out of the way of the corroding action of the acids and other products of combustion. The operation is somewhat as follows: The flue *a* stands in the air-space, and must, of course, become warm enough to produce an upward current of air within it, while at the same time it is prevented from becoming much heated by the cool current within, taken directly from the cold air at the bottom. Its lower end, also, is constantly surrounded with cold air. For these reasons it becomes an excellent differential expansion member to combine with brass rods. The rods *b c* are of brass, and extend with *a* through the entire column of air, the cold at bottom, the intermediate, and the hot air at top. As the air in *n* gets heated, the excess of expansion in the double rod *b c* over that of the chimney *a* will permit the long arm of *e* to droop, and allow the weight *k* and the arm *j* to fall and open *m* in a degree proportionate, first, to the temperature of the hot air, and, secondly, modified proportionately to the intensity of the cold in the cold air acting on the lower parts of the differential expansion agents *b c* and *a*. The double current is therefore admitted by the valve *m*, proportionately checking the draught, and consequently the combustion, and modifying the heat. As the heat is lessened below the degree required, and for the maintenance of which the weight *k* has been adjusted upon *j*, the rods *b c* contract faster than *a*, and close, or partially close *m*.

223,973. INSIDE BLIND. — John M. Abbott, Tama City, Ia.

223,984. FIRE-EXTINGUISHER. — Heinrich Böhle, Spandau, Prussia, German Empire.

223,985. DOOR-HANGER. — Thomas H. Bottomley, Capac, Mich.

224,006. TOOL-POST FOR TURNING LATHES. — Giles S. Fales, New Bedford, Mass.

224,015. MACHINE FOR PRESSING AND MOULDING CLAY INTO TILES AND OTHER ARTICLES. — Israel Hogeland, Indianapolis, Ind.

224,020. STEP-LADDER. — Melvin N. Lovell, Erie, Penn.

224,021. WINDOW SHUTTER AND OPERATING DEVICE. — William H. Lotz, Chicago, Ill.

224,029. WEDGE FOR AXE AND TOOL HANDLES. — George P. Morrill, Canterbury, N. H.

224,040. LATCH. — Augustus B. Prouty, Worcester, Mass.

224,060. ELECTRIC BURGLAR ALARM. — William L. Voelker, Morton, Penn.

224,078. EMERY CLOTH. — Franklin Copeland, Boston, Mass.

224,092. DOOR-CHECK. — Nelson Kidney, Dunkirk, O.

224,106. DOVETAILING MACHINE. — Gustavus W. Parker, Brunswick, Me.

224,110. PORTABLE WINDOW SCAFFOLD. — John Skidmore, Chicago, Ill.

224,125. SIGNAL FOR WATER-CLOSETS. — Delos R. Baker, Cincinnati, O.

224,129. FIREPLACE. — John H. Beard, Providence, Ky.

224,131. STEAM RADIATOR. — George W. Blake, New York, N. Y.

224,150. STONE-TURNING LATHE. — Lucius B. Clogston, Fair Haven, Vt.

224,154. CHIMNEY-TOP AND VENTILATOR. — George W. Demond and Louis Demond, Brooklyn, N. Y.

224,156. DIE FOR FORMING DOUBLE-TWIST GIMLETS. — Amos H. Dense and James S. Dense, Chester, Conn.

224,173. FIRE-PROOF BUILDING. — Joseph Gilbert, Philadelphia, Penn.

224,182. APPARATUS FOR MAKING WELLS. — James W. Hammett, Willow Island, W. Va.

224,213. OPERATING HATCHWAY DOORS. — George W. Mouldin, St. Louis, Mo.

224,228. MANUFACTURE OF SHEET-METAL TUBING. — David A. Ritchie, Chelsea, Mass.

224,244. FASTENING FOR TOOL-HANDLES. — A. E. Tangen, Bismarck, Dak.

224,251. ELASTIC RUBBER TOOL HOLDER OR HANDLE. — Abel D. Tyler, Brockton, Mass.

9,064. METAL-WORKER'S TOOL. — (*Reissue.*) Spencer G. Wilcox, Weedsport, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since our last report: —

C. W. Bornman, three-st'y brick building, on Decker St.

A. J. Bond, 2 three-st'y frame buildings, 230 and 232 Argyle Ave.

C. F. Richter, 7 three-st'y brick buildings, cor. Townsend and Cary Sts.

Messrs. Broderick & Bro., four-st'y brick warehouse, on Pratt St., near Green St.

Mrs. A. E. Nedwell, two-st'y brick building, on Charles St., bet. Saratoga and Pleasant Sts.

Herman Leer, three-st'y building, cor. Park and Marion Sts.

Henry Becker, three-st'y brick building, on Gay St.

John L. Stieff, three-st'y brick building, on Baltimore St., bet. Green and Pine Sts.

WAREHOUSES. — Mr. E. F. Baldwin, architect, is preparing drawings for two new warehouses on Sharp Street, for John King, Jr., Esq. The front on Sharp Street will be 60 feet 3 inches, and on alley in rear 47 feet 10 inches, and the depth 216 feet 7 inches. The front on Sharp Street will be of pressed brick, with Cheat River stone finish, excepting the first story, which will be of iron.

Mr. Jackson C. Gott, architect, has just completed drawings for a new warehouse to be built on Howard Street, between Lombard and German, for Messrs. Johnston Brothers, bankers, to be known as the Johnston Building. It will have a front of 60 feet on Howard Street, and will be five stories high, with iron front. The contract has not yet been awarded.

ELEVATOR. — The preliminary arrangements for the building of the new B. & O. R. R. elevator are being made, and it will soon be under way.

FREIGHT DEPOT. — The new freight depot now building at the foot of Patapsco Street, by Messrs Adams & Brother, for the Philadelphia, Wilmington & Baltimore Railroad Company, will soon be finished. The wharf is 70 by 300 feet, and supports the freight depot, which is 60 by 300 feet.

DWELLING. — The contract for a new dwelling-house to be built on the corner of Calvert and Chase Streets, was awarded to Mr. John Brown. The building is to be 22 feet front on Calvert Street, and 79 feet on Chase Street, three stories high. Messrs. Wyatt & Sperry are the architects.

SCHOOL-HOUSE. — The committee of Primary School No. 7 has asked for an appropriation of $15,000.

Boston.

BUILDING PERMITS. — Since our last report the building permits granted are as follows: —

Brick. — 53 *and* 55 *South St.*, for Wm. H. Allen, 1 store, 27′ x 92′; five stories; J. P. Neal, builder; Bradlee & Winslow, architects.

57 *South St.*, for A. L. White, 1 store, 33′ by 103′; five stories; J. P. Neal, builder; Bradlee & Winslow, architects.

59 *South St.*, for Alex. Moseley, 1 store, 27′ x 104′; five stories; J. P. Neal, builder; Bradlee & Winslow, architects.

Wood. — *Conant St.*, Ward 23, for Wm. Hardcastle, 1 dwell., 22′ x 33′; three stories; S. Rantin, builder.

North Beacon St., Ward 25, for G. W. Hollis, 1 icehouse, 30′ x 150′; J. Berry, builder.

Lamartine St., Ward 23, for J. A. Framptor, 1 morocco factory, 20′ x 34′; J. Luippold, builder.

The season is opening 10 per cent better than last year.

FRENCH WINDOW GLASS. — The late rise in prices abroad and the large demand here have stiffened prices very much. Discounts depend on sizes and quantities wanted, and may be generally quoted at 40 to 50 per cent. Stocks are good here and generally well assorted.

POLISHED PLATE GLASS. — The imported plate is in good stock here at present. Prices are rising rapidly abroad, but still remain here at about 50 to 50 and 10 per cent discounts from tariff.

RAILROAD DEPOT. — It is said that the directors of the Boston & Albany Railroad will build a more substantial and costly passenger station than they first proposed, though they have not decided finally upon any plan.

Brooklyn.

BUILDING PERMITS. — *Kent Ave.*, cor. Kosciusko St., 1 three-st'y brick store and tenement, 24′ x 50′; owner, Charles Fasnau, Skillman St; carpenter, Edward Van Voorhis; mason, Patrick Kernan.

Grand St., 1 one-st'y brick glass factory, 50′ x 70′; owners, J. M. & William Brookfield.

Prospect Place, 3 three-st'y frame dwells., 16′ 8″ x 45′; owner and builder, Wm. H. Cousens.

Tompkins Ave., cor. Putnam Ave., 1 two-sty brown-stone dwell., 20′ x 40′; owner and carpenter, Daniel B. Norris, 417 Putnam Ave.

Kent Ave., 1 two-st'y brick factory, 81′ 3″ x 30′ 6″; owner, William Schroeder, 78 Morton St.; architect, A. Herbert; mason, V. Bruchhauser; carpenter, Andrew Scheid.

Clay St., 1 three-st'y frame tenement, 25′ x 38′; owner and carpenter, James Mullin, 112 Clay St.; architect, James Muihaui; mason, Samuel Beamish.

Ainslie St., No. 109. 1 two-st'y frame dwell., 20′ x 34′; owner and carpenter, R. B. Ferguson, 250 Hewes St.; architect, W. H. Gaylor; masons, Smith & Bisson.

Wyckoff St., 3 three-st'y brown-stone tenements, 20′ x 45′: owner, George W. Brown, 728 Fulton St.; mason, Levi Brown; carpenter, C. E. Cozzens.

Nassau St., cor. Adams St., 1 four-st'y brick store and tenement, 25′ x 54′; owner, Mrs. M. A. E. F. Demarest, 4 Watts St., New York; architect, S. Bennett; builders, W. & T. Lamb and Jenkins & Gillies.

Bushwick Ave., cor Cornelia St., 4 three-and-one-half-st'y brown-stone dwells., 16′ 8″ x 45′; owner, Thomas Morgan, 53 Bleecker St., New York; architect, T. F. Houghton.

ALTERATION. — *Charles Place, Nos.* 6 *and* 8, three-st'y frame extension, 25′ x 40′, tin roof; cost, $2,500; owner, Thos. Lyon, on premises; builder, Wm. Horring.

ASYLUM — The Home for Incurables is building under the charge of Mr. C. C. Buck, architect; cost, $33,000.

HOUSE. — Mr. C. C. Buck, architect, is building a detached house which will cost $45,000.

Buffalo.

STORE. — Mr. Argus is to put up a brick building on the corner of Hamilton and Niagara Streets; three stories high, 75 by 29 feet; cost, $5,000; Jno. Druar, contractor; F. C. Bate, architect, Cleveland, O.

Chicago.

BUILDING PERMITS. — During January the Building Department issued 196 permits, covering 87 permanent improvements. In 1879, in January, the department issued 55 permits, covering 23 permanent structures. Last week the department issued 55 permits, for structures costing $75,200. The following are some of the more important ones: —

Clark St., No. 214, vault for building belonging to the Peck Estate; cost $10,000.

Indiana St., No. 264, two-st'y livery stable and dwell., for Joseph Hawk; cost, $2,000.

Dayton St., two-st'y dwell., for Scott & Gage; cost, $5,400.

Canal, near Mather St., four-st'y manufactory for E. H. Stark; cost, $20,000.

Illinois, near Dearborn Ave., two-st'y shop, for M. Brund; cost, $4,000.

Superior St., No. 158, three-st'y dwell., for Caroline Harth; cost, $4,500.

Sholto St., No. 25, two-st'y dwell., for Hannah Martin; cost, $3,000.

Ashland Ave., near Thirty-third St.; two-st'y store and dwell.; cost, 2,900.

Wesson St., No. 104, two-st'y dwell., for A. Anderson; cost, $2,400.

Fulton St., No. 867, two-st'y dwell., for A. E. Gould; cost, $2,000.

OPERA-HOUSE. — It is rumored that Manager J. H. McVicker has been approached by Eastern capitalists, who have already guaranteed him $100,000, if he will interest himself in the formation of a company for the erection of a grand opera-house in Chicago.

Cincinnati.

BUILDING PERMITS. — The following building permits have been issued during the month of January: —

Taylor & Faulkner, two-st'y frame; cost, $1,500.
A. Saunders, three-st'y brick; cost, $1,200.
Jas Dalton, two-st'y brick; cost, $2,000.
B. McCormick, two-st'y brick; cost, $3,200.
Krymer & Bro., five-st'y brick; cost, $7,500.
W. Schumaker, one-st'y brick; cost, $600.
F. W. Handy, three-st'y brick; cost, $3,000.
H. E. Clover, two-st'y frame; cost, $2,900.
H. J. Reedy, two-st'y brick: cost, $800.
Thos. Emery's Sons, 4 three-st'y brick; cost, $10,000.
Thos. Emery's Sons, 4 three-st'y brick; cost, $10,000.
T. Moorman, four-st'y brick; cost, $6,000.
D. DeCamt, six-st'y brick; cost, $12,000.
J. T. Williams, one-st'y frame; cost, $900.
L. Grover, two-st'y brick; cost, $3,000.
H. Wendel, three-st'y brick; cost, $4,000.
M. Douglas, two-st'y brick; cost, $1,000.
B. Manning, three-st'y brick; cost, $2,600.
J. Jones, three-st'y brick; cost, $6,000.
Twenty-six permits for repairs; cost, $5,475.
Total permits, 45; total cost, $83,675.

HOUSES. — Mr. George W. Rapp, architect, has in charge at present the following work: —

Dwelling-house for J. Lammert on Mount Auburn; eight rooms; brick; cost, $5,000.

For Wm. Strunk, a frame dwelling on Walnut Hills; 10 rooms; cost, $6,600; J. W. Cotteral & Son, builders.

Frame house for Dawson Blakemore; cost, $7,000; Woodburn Avenue.

For Dr. C. D. Palmer, a stone-front on Seventh Street, opposite Smith Street, 32 by 80 feet; two-and-a-half stories high; cost, $7,000.

For Edwin Stevens, on May and Crown Streets, brick house; cost, $5,000.

For Patrick Britt, a stone-front on Eighth Street, near Elm, cost, $7,000.

For Gustave Lowenstein, a stone-front on Ninth Street, near John Street; three stories; cost, $7,000.

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For H. H. Hoffman, four one-story frames on Front Street; three rooms each.

Mr. J. W. McLaughlin, architect, has prepared plans for a limestone dwelling for T. P. Mitchell, to be built in Avondale; cost, about $12,000.

J. F. Mills has started six new houses on Walnut Hills, eight rooms each; cost, $17,000.

Frank W. Handy will build six half-timbered houses on Mount Auburn, from designs of Mr. McLaughlin. The first story stone; above will be wood and cement; cost, about $20,000.

RAILROAD DEPOT. — The plans and specifications of the new depot to be built by the P., C. & St. L. Railroad Company, at the corner of Pearl and Butler Streets, are completed, but have not as yet been adopted by the Philadelphia authorities.

Cleveland.

FOUNDRY. — Myers, Osborn & Co. are making extensive alterations and additions to their foundry; brick; cost, about $6,500; Jno. T. Watterson, contractor.

CAR-WHEEL FOUNDRY. — Maher & Brayton are building an extensive foundry on the flats, corner C., C., C. & I. Railway and Carter Street; frame; cost, about $22,000; Jno. T. Watterson, contractor.

DEPOT. — The A. & G. W. Railway and the Valley Railway are to build a union depot in or near the old canal basin. The probable cost will be from $30,000 to $50,000. Work will be commenced as soon as the Valley Railway brings its track into the city.

ARMORY. — The armory is nearly enclosed, and will be dedicated May 30.

Indianapolis.

CHURCH. — The trustees of the First German Church of Evangelical Association of North America have purchased lots 1 and 2 of outlot 58, southeast corner of New York and East Streets, for $5,000, for the purpose of building a church, and will build a brick church there as soon as the funds on hand will warrant it.

HOUSE — Mr. C. A. Wallingford, architect, is building a house for Mr. A. M. Hyde; cost, $3,000.

PACKING HOUSE. — Kingan & Co., pork-packers, are building a brick building near their pork-house. It will be two stories high, with carpenters' and tinners' shops above, and stable below, costing $5,000.

New York.

BUILDING PERMITS. — *One Hundred and Twenty-seventh St.*, 1 one-and-one-half-st'y brick ice-house, 52′ 8″ x 110′; cost, $20,000; owner, David Yuengling, cor. One Hundred and Twenty-eighth St., and Tenth Ave.; architect, Anthony Pfund.

Seventeenth St., No 438 *W.*, 1 two-st'y brick wheelwright shop, 25′ 1″ x 91′; cost, $4,000; owners, Saidler & Co., 441 W. Seventh St.; architect, Alexander M. McKean; carpenter, John L. Hamilton.

Fifty-sixth St., 3 four-st'y brick (brown-stone front) dwells., 17′ x 55′; cost, each, $14,000; owner, Henry Greer, 87 E. Fifty-sixth St.; architects, D. & J. Jardine; mason, Samuel Lowden; carpenter, John Geagan.

Sixty-sixth St., 2 four-st'y brick (brown-stone front) dwells., one 22′ x 62′, and one 19′ x 62′; cost, respectively, $25,000 and $22,000; owner, C. W. Luyster, 359 W. Fifty-second St.; architect, James E. Ware; masons, Sinclair & Wills.

Thirty-eighth St., Nos. 418 *to* 426 *W.*, brewery, 50′ x 28′, fermenting-house, 48′ x 70′, cooper's shop, 79′ x 22′, office, etc., 22′ x 40′; all of brick; total cost, $50,000; owner, William Brown, 49 Broadway; architects, Lederle & Co.

Broadway, No. 368, 1 five-st'y brick store, 25′ x 150′; cost, $40,000; owners, Trustees of C. L. Wolfe, 3 Mercer St.; architect, John B. Snook.

Forty-ninth St., 1 three-st'y brick car stables; 325′ x 93′ 5″; cost, $60,000; owners, Eight Ave. Railroad Co., Fiftieth St. and Eighth Ave.; architect, John Correja.

Clinton St., No. 17, rear, 1 four-st'y brick workshop, 25′ x 26′; cost, $3,700; owner, D. Zimmermann, 13 Clinton St.; mason, John Fish.

Sixty-sixth St., 2 four-st'y brick (brown-stone front) dwells., one 25′ x 62′, and one 22′ x 62′; cost, severally, $27,000 and $24,000; owner, C. W. Luyster, 359 W. Fifty-second St.; architect, James E. Ware.

Avenue A, Nos. 165 *to* 171, 4 five-st'y brick tenements, with stores on first floors, 23′ 8″ x 76′; cost, each, $11,000; owner, Louis Rollwagen; architect, William José.

Canal St., No. 334, 1 five-st'y brick store, 25′ 10″ x 116′ 10″; cost, $32,000; attorney, Wm. Mitchell, 60 W. Ninth St.; architect, William E. Bloodgood; mason, Freeman Bloodgood; carpenters, Charles E. Hadden & Bro.

Mulberry St., Nos. 136 *and* 136½, 1 five-st'y brick factory, 50′ x 88′; cost, $16,000; owner, G. L. Yaeger, 69 Wooster St; architect, William Graul.

Forty-sixth St., 1 four-st'y brick (brown-stone front) dwell., 25′ x 60′; cost, $38.000; owner and builder, James C. Lynd, 50 West Fifty-fourth St.; architects, Wilson & Carter.

Seventh St., No. 29, 1 five-st'y brick apartment-house, 28′ x 65′; cost, $11,000; owner, Isaak Horchster, 50 St. Mark's Place; architect, Jobst Hoffman.

Third Ave., No. 396, 1 five-st'y brick store and tenement, 24′ 4″ x 57′ 6″; cost, $10,000; owner, Edward Ward; architect, Wm. José.

Fifty-first St., Nos. 112 *and* 114 *E.*, 1 two-st'y brick stable, 46′ 6″ x 29′ 6″; cost, $3,000; owners, F. & M. Schaefer Brewing Co., on the premises; architect, Wm. José.

Sixty-sixth St., 2 four-st'y brick (brown-stone front) dwells., 28′ x 62′ and 25′ x 62′; cost, $32,000 and $30,000; owner, C. W. Luyster, 359 West Fifty-second St.; architect, James E. Ware; builders, Sinclair & Wills.

Lexington Ave., cor One Hundred and Seventh St., 1 three-st'y brick (brown-stone front) dwell., 17′ 7″ x 45′; cost, $9,000; owner, Ann E. Davis, One Hundred and Fifty-eighth St. and Kingsbridge Road; architect, J. H. Valentine; builder, John B. Davis.

Lexington Ave., 5 three-st'y brick (brown-stone front) dwells, each 16′ 8″ x 45′; cost, each, $8,500; owner, Ann E. Davis, One Hundred and Fifty-eighth St. and Kingsbridge Road; architect, J. H. Valentine; builder, John B. Davis.

Seventy-second St., 6 four-st'y brick apartment-houses, each 28′ x 62′, with extension 15′ x 18′; cost, $13,000 each; owner, James Fee, 210 East Sixty-second St.; architect, J. H. Valentine.

Fifty-seventh St., 1 five-st'y brick apartment house, 25′ x 61′, with extension 16′ x 20′; cost, $20,000; owner, Edward C. Coggeshall, 158 East One Hundred and Fifth St.; architect, Geo. B. Pelham.

One Hundred and Seventeenth St., 3 three-st'y and basement brick apartment-houses, each 16′ 8″ x 50′, and extension 10′ x 15′; each, $6,000; owner, A. M. Jenny, 318 East One Hundred and Fourth St.; architect, J. H. Valentine; builder, Mr. Handwerk.

ADDITION. — An addition to the store of Messrs. Ehrich Brothers, on Twenty-fourth Street, near Eighth Avenue, is to be made. Mr. H. J. Hardenberg is the architect.

ALTERATIONS. — *Forty-ninth St.*, two-st'y brick workshop, 30′ x 109′ 5″, damage by fire to be repaired; cost, $2,500; owners and builders, Eighth Ave. R. R. Co.; architect, John Correja.

Exchange Place, Nos. 20, 22, *and* 24, four-st'y brick office building, roof to be raised 10′, new front on Exchange Place, and internal alterations; cost, $20,000; owner, Royal Phelps, 24 Exchange Place; architect, Thos. R. Jackson.

Broadway, Nos. 156 *and* 158, four-st'y brick office building, two stories to be added and an elevator to be constructed in court; cost, $20,000; owners, Estate of D. Henry Haight; architect, S. D. Hatch.

Rivington St., No. 114, cor. Essex St.; six-st'y brick furniture warerooms, new store front and internal alterations; cost, $1,300; owners, Estate of Charles Eversly; carpenter, Edward Smith; masons, Lyons & Bunn.

Canal St., No. 272, four-st'y brick store, internal alterations; cost, $1,500; owners, Isaacs & Samuels; architect, Theodore J. Bier; mason, ——— Dunn; carpenter, John B. Doyle.

Washington St., No. 430, two-st'y brick store, to have two stories added and new store front; cost, $1,000; owners and builders, Fletcher, Harrison & Co., 266 and 267 West St.

Greenwich Ave., Nos. 97 *and* 99, two-st'y brick building, to be altered internally; cost, $2,500; owner, J. Sharpe; carpenter, J. H. Brown; mason, Linus Scudder.

Avenue A, No. 231, four-st'y store and tenement, front wall to be taken down and rebuilt; cost, $1,500; owner, George Kiefer, 231 Avenue A; architect, Jobst Hoffman.

William St., cor. Pine St.; six-st'y brick office building, internal alterations; cost, $2,500; attorneys, Iselin & Warner, on the premises; architects, Potter & Robertson; builders, Lyons & Bunn.

Mulberry St., No. 301, three-st'y and attic brick office and dwell., full story to be made of attic; cost, $1,000; owner, Richard A. Storrs, Comptroller's Office; builder, Victor Seaman.

The building No. 4 Front Street is to be remodelled by the New York Elevated Railroad at an estimated cost of $12,000.

APARTMENT-HOUSE — On the corner of Eighty-sixth Street and First Avenue an apartment-house, 25 by 86 feet, is to be built by Mr. Blankenstein.

BRICK. — There has been a great deal of interest felt this week on the floor of the "Mechanics'" Exchange in regard to the rise in the price of building materials, and the consequent effects on building operations. There seems to be a general feeling that the price of brick, $10.50 per M., will not be maintained, and even if it were, the rise in rents would allow of buildings being erected, which would yield a fair rental.

INSURANCE BUILDING. — It is reported that the Liverpool and London and Globe Insurance Company will invite competitive designs for a fire-proof building to be erected by them this spring.

HOUSES. — On Third Avenue seven houses are to be built, from designs of Mr. Valentine.

LIBRARY. — The Mercantile Library project is likely to be delayed, as no arrangements have yet been made for the disposal of their present lease.

TENEMENT-HOUSE. — On Thirty-first Street, near Seventh Avenue, a tenement-house of brick, with stone and terra-cotta finish, is to be built, from designs of Mr. James Stroud.

Philadelphia.

BREWERY. — Mr. H. J. Swartzman, of New York, has prepared designs for Lauber's new brewery.

CHAPEL — There will soon be built, at the rear of the Tabernacle Baptist Church, Eighteenth and Chestnut Streets, a chapel of brick and stone, 35 by 80 feet; cost, $15,000; D. S. Gendell, architect.

WAREHOUSE. — On Filbert Street, above Eighth, Messrs. Yarnall & Cooper, John K. Yarnall, architects and builders, are building, for Hood, Boubright & Co., a large warehouse. This building, 72 feet 6 inches by 114 feet, will be six stories in height, built of pressed brick and stone, and buff and black bricks.

ELEVATED RAILROAD. — Workmen are busily engaged in tearing down old buildings, of which about seventy-five have already been taken down. Piers are now being built in the river and on both sides, for the construction of the iron bridge to run across the river at Filbert Street.

STORES. — At 50 North Eighth Street a store is being built, 20 by 100 feet, three stories in height; cost, between $3,000 and $4,000; John S. Andrews, architect.

By the same architect, alteration of store 1126 and 1128, Chestnut Street; cost, about $5,000.

Thomas Little is altering the stores of Partridge & Richardson, 17 and 19 North Eighth Street; cost, about $5,000.

Alterations at stores 730 and 732 Chestnut Street, for Geo. A. Castor & Co.

St. Louis.

BUILDING PERMITS. — Twenty-six permits have been issued since our last report, six of which are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows: —

Owners.	Use.	Stories.	Rooms.	Cost.
J. W. Kauffman.	Mill.	3	3	$2,500
A. Berkhout.	Dwelling.	2	12	2,900
Mrs. L. Williamson.	Dwelling.	3	12	8,000
A. Zilla.	Dwelling.	3	4	10,000

Washington.

MARKET-HOUSE. — Mr. Talbot's House Bill to provide for building a market-house has been referred to the Committee for the District of Columbia.

Public Buildings.

DANVILLE, VA. — Mr. McKenzie's bill to provide $60,000 for building a court house in this place has passed the House of Representatives.

DENVER, COL. — The House Committee on Public Buildings and Grounds has recommended an appropriation of $200,000 for a public building.

GREEN BAY, MICH. — Mr. Bouck has introduced a bill in the House recommending the building of a light-house at the entrance of Green Bay and Sturgeon Bay Canal.

LANCASTER, PENN. — Mr. Smith's bill to provide for purchasing a site for a new post-office and revenue-office building has been referred to the Committee on Public Buildings and Grounds.

MINNEAPOLIS, MINN. — An appropriation of $100,000 has been recommended by the House Committee of Public Buildings and Grounds.

OXFORD, MISS. — The Committee on Public Buildings and Grounds has before it Mr. Harris's bill to provide for building a court-house and post-office.

PADUCAH, KY. — The House Committee on Public Buildings and Grounds has recommended an appropriation of $100,000 for a public building.

PEORIA, ILL. — Mr. Boyd's bill to provide for building a public building in this city has been referred to the Committee on Public Buildings and Grounds.

QUINCY, ILL. — The House Committee on Public Buildings and Grounds has recommended an appropriation of $150,000 for a public building in this city.

General Notes.

ALEXANDRIA, MINN. — Douglas County is going to build a jail, at a cost not to exceed $6,000.

ALLEGHENY, PENN. — The new depot of the West Pennsylvania Railroad Company, on Federal Street, will be built by Hoover, Hughes & Co., of Tyrone. The building will have a 40 feet front on Federal Street and extend 70 feet back, the north side being 100 feet from the track. It will have two stories and an attic.

ANDERSON, IND. — Messrs. B. V. Enos & Son, architects, of Indianapolis, are building a store for Robinson & Lovette; cost, $15,000.

Mr. C. A. Wallingford, architect, is building houses for M. Eckhouse and N. J. Osgood, costing respectively $6,000 and $20,000.

BIRMINGHAM, CONN. — The Naugatuck and Derby Railroad Companies are to build a new union depot here.

BLUE HILL, ME. — Colonel Wm. H. Darling is preparing to build two blocks, one of which will be occupied as a bank.

CLAREMONT, N. H. — Improvements to the amount of $25,000 in the Sugar River paper-mill at this place are thought of.

FAIRMOUNT, ILL. — The Board of Fire Commissioners has recommended building a $5,000 engine-house.

FERGUS FALLS, MINN. — The Fergus Falls *Journal* says: The firm of J. Q. Adams & Co., St. Paul, is now building a grain house at this place, just east of the steam elevator.

FORT DODGE, IO. — The Presbyterian Society has $7,800 pledged toward building a $10,000 church.

Plans for a Catholic church, to cost about $30,000, have also been perfected.

FRANKFORT, KY. — The estimated cost of a proposed extension of the penitentiary is $229,726, but if convict labor is used $40,000 will be saved.

LAFAYETTE, IND. — The Commissioners of Tippecanoe County have invited plans and specifications from architects for a court-house costing in the neighborhod of a quarter of a million dollars. The plans are to be examined at the regular March term of the board.

LONG BRANCH, N. J. — Mr. R. J. Dobbins is about to make another fine improvement here. The Atlantic Hotel is to receive important alterations and the front of the building is to be lengthened about fifty feet.

LOUISVILLE, KY. — Sebastian Krebs, a two-story brick dwell., Chestnut Street, between Hancock and Clay; cost, $1,000.

MILLVILLE, MASS. — In the spring the Lawrence Felting Company is to build a boiler-house of stone, 40 by 80 feet, and a stone picker-house, one story high, 50 by 35 feet; also, a mill 60 by 40 feet, two stories high.

MORRISTOWN, IND. — Mr. J. H. Stem, of Indianapolis, is the architect of the new church.

OSTERVILLE, MASS. — A $6,000 cottage is to be built here for Mrs. E. B. Chase, of Providence.

SELMA, ALA. — A wing of one of the hotels is to be converted into an opera-house.

SHELBYVILLE, IND. — The members of the Methodist Church have at last decided to remodel the church at a cost of about $10,000. The work will be commenced in a short time.

ST. PAUL, MINN. — E. McKinney intends to build a first-class carriage repository on Wabasha Street, adjoining the Odd Fellows' Block.

Mr. Richards Gordon and Commodore Davidson will probably build two large stores on the vacant lots on Third Street, opposite the Merchants' Hotel.

Commodore Davidson also expects to put up an immense structure on the northwest corner of Fifth and Wabasha Streets.

WAPAKONETA, O. — Messrs. Herbst & Brother are building a carriage factory on Auglaize Street.

WATERTOWN, MASS. — A country house of wood is about to be built for Mr. A. O. Davidson. Mr. Henry Hartwell, of Boston, is the architect. The contract is just let to H. W. McCurdy for $10,000.

Bids and Contracts.

BALTIMORE, MD. — Mrs. E. G. Smyser, of the Variety Iron Works, has been awarded the contract for the iron-work of the Ward Building, on the northeast corner of Charles and Baltimore Streets.

COOPERSTOWN, N. Y. — The contract for the new court-house has been awarded to S. R. Barnes and McCabe Brothers, for $24,995. The bid of B. Patrick, of Herkimer, was $25,000.

HOLYOKE, MASS. — Messrs. D. H. & J. C. Newton have taken the contract for building a paper-mill for the Hosford Paper Company. The buildings comprise an engine room 122 by 40 feet, two stories; bleaching and rag rooms, 146 by 36 feet, three stories; machine room, 137 by 33 feet, two stories; finishing room, 98 by 36 feet, three stories. Work has begun. The drawings are made by D. H. & A. B. Tower, architects, who have in hand the plans for three mills to be built the coming season.

MINNEAPOLIS, MINN. — The contract for the stone-work on the new Westminster Church has been let to Messrs. Downs & Baxter, of this city, at $24,900 for all the stone-work above the basement.

NORTH ADAMS, MASS. — John M. Galvin, of Boston, has the contract for arching the central shaft of the tunnel, putting in air-chambers for ventilation, and excavating for a telegraph office, his bid being about $17,000.

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THE School-House Competition of the *Sanitary Engineer* has brought out, it is said, one hundred and eighty plans, from architects in various parts of the country, which are exhibited in the Academy of Design, pending the decision of the Committee of Award. It was none too soon to direct attention to the question of school-houses, if we may judge by the complaints against those of New York which we read in the newspapers. It would seem that there was nothing, indeed, for which the city had made a less satisfactory provision, a fact which may indicate that, after all we have heard, those who have in past times had the distribution of her expended moneys have not taken the full measure of their opportunities. The mass of her 140,000 school-children are crowded together in the most extraordinary way. At a meeting of the Sanitary Reform Society, for examination of the plans, it was said that some school-houses which had been built for eight hundred pupils were occupied by not less than twenty-eight hundred. In some of the wards the attendance has almost doubled since ten years ago, without increase of the accommodation which was then thought necessary. As the *Times* said a few days ago, this crowding is likely to continue while the schools are open to children from four years old. It is a great mistake to receive children of this age into the same schools, or even the same buildings, that are usually provided for children a few years older. The age, however, is one at which poor mothers are apt to find their children peculiarly in the way, since they are troublesome to take care of, and can be put to no possible use. So that, so long as there are not infant schools for them, they are likely to crowd the others.

WHEN there is so much negligence in the accommodation, it is not surprising that the school-houses are ill ventilated and badly lighted. The *Times* tells us that in school-house No. 8, for instance, is a room in which two hundred and twenty children are stored, who have to read and write by gas-light, except during the brightest hours of the sunniest days; and that in another school-house, No. 70, the children in several rooms cannot see to read and write in stormy weather. In several others of the buildings the class-rooms have to be lighted by gas either all the time, or a great part of it. Naturally enough, the eyesight of both teachers and pupils suffers. In school-houses built about closely with high buildings, it goes without saying that ventilation as well as light is wanting, and the committee of the Board of Education which lately reported on the matter is doubtless justified in saying that the prevalence of lung diseases is in part attributable to the bad air which children breathe at school. The committee adds that "when children are packed into a small room, with about thirty cubic feet of air to each, ventilation is impossible even by keeping every window in the room wide open: yet this state of things exists in many of our public schools." We should like to believe that there was a clerical error in this statement, allowing, as it does, for each pupil, only a floor space of three square feet, including passageways, for a room ten feet high; and a fifth part, or less, of the cubic space which he ought to have. As for the air that is to supply the unfortunates thus hived, it is often forced up through furnaces from damp cellars, or blown in from close yards defiled with privies and other nuisances. Americans are taught to believe in universal and compulsory education. This is doubtless a good thing *per se*, but if it is to mean compulsory vitiation of their bodies by foul air, and perhaps compulsory contamination by infectious diseases, it might be better to relax somewhat the rigor of the school laws, and limit the number of scholars which each building shall contain. The community which enacts that its children shall be sent to its schools is at least bound to see that the schools into which it forces them are not unwholesome.

WHILE Congress and the Washington Monument Committee are struggling with the national monument to Washington, and the people of Philadelphia are laboring, or resting, over theirs, a proposal has come up to build one in New York. Last year ex-Governor Seymour suggested the idea of a memorial of Washington's first inauguration, in New York, in a letter to the *Evening Post*, and it has germinated so well that schemes for carrying it out have apparently sprung up in two places at once. The New York Chamber of Commerce proposes, we are told, to appoint a committee of leading merchants, bankers, and business men to confer with the authorities of the United States, or of the city, and secure a site for a monument. Meanwhile, however, this movement has been anticipated by a number of gentlemen, who have begun to form a general committee to consist of one hundred and eighty members. Among the names given for members of this committee we find those of Messrs. Tilden, Thurlow Weed, Charles O'Conor, August Belmont, Edward Cooper, Jay Gould, Samuel Ward, James Gordon Bennett, and others, who may also be classed as leading merchants, bankers, or business men. These associate themselves with a more definite purpose to "erect a suitable monument to mark the spot on Wall Street, now occupied by the United States Treasury building, where George Washington first took the oath of office, and in the presence of both houses of Congress inaugurated the government of the United States under the federal Constitution." A general meeting is to be called to consider the plan which is proposed, — to set up on the eastern and western buttresses of the Sub-Treasury two colossal bronze groups, one of Hamilton and Clinton, and the other of Washington and Livingston, the buttresses themselves being encased in bronze and enriched with mouldings, bas-reliefs, figures of eagles, and inscriptions. For this project it is proposed to raise a subscription of fifty thousand dollars. The Chamber of Commerce, as appears from an article in the *Evening Post*, is not so decided in its intentions, and inclines to have "no connection with the house over the way," but to pursue an independent aim, and probably a different form of monument. We may trust that out of these two movements there may in some way come one memorial that will be a credit to the city, and that time may be taken to decide with deliberation and care what the form of the monument had better be. We have not heard the name of "the well-known sculptor," but one has a natural temptation to look with some anxiety for the appearance of any monument the form of which is taken as a foregone conclusion.

THE discussions of the Inter-Oceanic Canal problem seem to be drifting entirely away from the fundamental question of the natural fitness and practical convenience of routes or methods, and bid fair to become altogether political and personal. M. de Lesseps is said to be on the point of visiting the United States, bringing the estimates which result from his surveys of location, amounting to about one hundred and fifty millions of dollars, with the hope of inducing Americans to subscribe one half of it. Of the alternative methods proposed for obviating the danger of floods in the Chagres River, the favorite is said to be that of a great reservoir in the upper valley, guarded by sluice-gates. The tolls on vessels that pass through the canal are estimated at fifteen francs (three dollars) per ton. Appearances are that M. de Lesseps is likely to be disappointed if he expects any cordiality of reception, either from politicians or from capitalists. To raise one hundred and fifty millions of money for a project of which the profits are remote and uncertain is not easy, under the most favoring circumstances, in a country in which people are beginning to look forward, as they do now again in ours, to a quick and liberal return for their money. The political outlook is even less encouraging. The Secretary of State is said to hesitate to commit himself to a decided policy as yet, and to prefer to wait and see the Panama scheme die of

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inanition. The President, however, it is reported, has a very strong opinion in favor of enforcing the Monroe doctrine at once and so emphatically as to warn the French off from any attempt to build the canal. It is expected that he will send a message to urge this view upon Congress. Congress itself, so far as appears, and the political press of the country, seem pretty well united in opposition to what, unfortunately for a fair discussion of its merits, presents itself as a foreign scheme, and to be drifting rather helplessly, through an unconsidered and negative preference, into support of the project which is noisily put forward as the American one. The promoters of Captain Eads's scheme, it is said, are improving the opportunity to press his floating-dock railroad bill with all the influence of a powerful lobby.

It does not seem to us that the American attitude in this matter is a graceful one. It is unfortunate for us that the two questions have become inextricably confused which ought to have been kept entirely apart. — the questions where the canal should be, and who should control it. Whatever may be the importance, the wisdom, or the appositeness of the Monroe doctrine, the location of the canal is a matter to be considered quite independently of it, and should be decided by a different authority, so far as concerns the actual formation of opinion. If it is essential for the United States to control the canal when it is built, it was essential for them to be beforehand in determining the best route for it and to preoccupy it. It was also a natural duty to warn people of our determination to have control, and forestall their waste of money and effort in undertakings which we were unwilling to let them carry out. But while others worked we slept, and now we are waking up to a desire to prevent them from gathering the possible fruits of their labors. When Europeans were trying to rouse us to coöperation in a work which the commercial needs of the world were found to require, we lay still and would do nothing. When it was apparent that the question would be decided at the French congress, we sent delegates, who brought us back their opinion that the decision of the congress was foolish and impracticable, and had been prearranged, and that their own way was the only way; but no action was taken here. When at last we found that a serious attempt was making to carry out the decision of the congress, we began to discover that we were more interested in the canal than anybody else. At first the American delegates to the congress instructed us that their plan was the American plan, and our Congress was beset to provide for the construction of a canal accordingly. Now congress and the press are instructing us that we must not let Europeans carry out their plan in any case. In the mean time our people are as far as ever, we suspect, from an intelligent idea of what is really the best plan. If we could take an opportunity, in the midst of the political din, to adequately examine this question, we might bring ourselves into a proper position to decide these others, — whether we must, for the sake of our policy, interfere and ruin an undertaking which we have allowed to go so far without protest, though we were vitally interested in it; or whether we shall leave it to die the natural death to which the unwisdom of its conception entitles it, while we ourselves carry out the wiser scheme; or whether, finding it on the whole more promising than any scheme we have to substitute, we shall by purchase acquire a controlling interest in it, and see it carried through under our protection. Perhaps the least creditable attitude into which we can put ourselves is that of the dog in the manger.

It is said that Signor Brumidi's continued prostration, the result of the accident that happened to him some months ago while he was working on the frieze of the rotunda at Washington, has led the Committee on the Library to think seriously of appointing a successor to carry on the work. The painter who will occur to most persons as the one who would naturally have been called upon for this work is the late William M. Hunt, whose work at Albany would have made a fitting preliminary to the larger and more conspicuous task. Now that we have lost Mr. Hunt, it was natural that the committee should turn to Mr. LaFarge; and this, we are told, they are considering, though Mr. Vincenzio Steipevich, a Venetian painter living in New York, is also mentioned for the work. We know nothing of Mr. Steipevich's qualifications, but should hardly suppose that Mr. LaFarge, or any other artist who was really able enough for the work, would be inclined to follow closely in the track which Signor Brumidi has marked out. His designs are, as we have mentioned, for a series of paintings in mimic bas-relief representing scenes in the history of the country. Eight or nine of them, incidents of its discovery and early settlement, are already on the wall, although unfinished. Cartoons for the others are under way. The paintings were intended as a temporary substitute for a sculptured frieze which should in due time replace them; but this imitation of sculpture is distasteful, — would be so, we presume, to most of our readers, — and we have therefore argued against the desire to see Brumidi's work carried out here. At the same time it would be a superfluous disappointment to an artist who has given the greater part of his life's work to this building to see the part of it on which his interest was chiefly set given over to be replaced by another hand, while his own was still able to hold a brush, or even during his life. Brumidi's cartoons may be considered of value even if they are not to be reproduced in the place he intended them for. While we should not wish to see another artist employed to paint them on the frieze in the Capitol, and while we should yet be glad to see Mr. La Farge or a painter of his capability appointed to decorate the rotunda, one may well prefer to wait for it, and may like to see Brumidi retained in his position so long as he himself feels the desire and power to work, and indeed so long as he is left to this generation. There is no great haste to finish this part of the work; and the modest stipend that is assigned the artist is not too much for the Government to allow to one who has served it with zeal through many years, without enquiring too anxiously how much work he is at present able to accomplish.

The English building journals bring more exact accounts than we have seen before of the death of the late Professor E. M. Barry. It was probably the result of a disease of the heart, and very sudden. He had continued working as usual up to the very moment of his death. His third lecture to the students of the Royal Academy had been delivered on the previous Thursday. On Tuesday, the 27th ult., he had been busily at work all day at his office, — arranging, among other things, the diagrams for his fourth lecture, which was to have been given on Thursday evening, — and in the same evening attended a meeting of the council of the Royal Academy, of which he was treasurer. While speaking on some resolutions he suddenly fell to the floor, and died in a few moments. His physician had already warned him of the necessity of interrupting his work; and he had proposed, so soon as his course of lectures was finished, to go abroad for relaxation and change. The notices of his life in the English papers give hearty testimony of the esteem in which he was held in his profession, at once for his attainments, and for his personal qualities as well as his artistic powers. He was held in honor abroad as well as at home, being an honorary member of the Academy of Vienna, and of the Academy and the Society of Architecture, at Amsterdam. He also received a medal of honor at the Paris Exhibition of 1878, having the year before been awarded the English Royal Gold Medal. Here is occasion for us to correct a blunder into which we fell in our notice of Mr. Barry's death, a fortnight ago, in which we spoke of Mr. Barry as having been president of the Royal Institute. His older brother, Mr. Charles Barry, who survives him, was Sir Gilbert Scott's successor in the chair of the Institute, of which Mr. Edward Barry at the time of his death was one of the vice-presidents. We fear that we may have fallen into a like error in ascribing to him the alterations of Burlington House, of which we find no mention in the list of works now ascribed to him. We wrote from recollection, for correcting or verifying which we have not our usual means at hand, owing to the loss of our files of the English journals in the fire of last January.

ROMANESQUE ARCHITECTURE. V.

[From an article by Mr. E. A. Freeman. See pages 28, 37, 45, 55, *ante*.]

In Germany then the Primitive style was not so much displaced as improved, and no hard line can be drawn between the earliest buildings of the country and the latest in which no signs of the coming Gothic have begun to show themselves. In other countries, the latter half of the eleventh century is marked by a distinct change of taste, and in England we find a distinct displacement of one style by another, just as there was a partial displacement of one language by another. The art of Normandy became the fashion just as the speech of Normandy did. In Aquitaine it is hardly possible to avoid seeing the working of an influence from a more distant quarter, the result of an acquaintance with Eastern forms, Byzantine and Saracenic. In Italy the change took the shape of a falling back upon earlier forms which brings the architecture of the eleventh and

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twelfth centuries far nearer to classical models than the architecture of the intermediate ages. But everywhere the latter half of the eleventh century is a time of great architectural developments. The age when men's minds were stirred up to and by such events as the struggle between Pope and Cæsar, as the first preaching of the Crusades, as the great advance of the Christians in Spain, as the Norman conquests of England and Sicily, was an age which could hardly fail to leave its mark on art, as well as on every other fruit of man's intellect. It is no slight sign of the times that the mighty temple of Pisa was reared as a trophy of victories won by her gallant citizens over Saracenic enemies in fellowship with Norman allies.

In Italy then the change took the form of a revival. Between the days of Ravenna and the days of Pisa and Torcello a style had been worked out in the great churches of Milan and Pavia, in which the massiveness of the square pier seems to have reached its height, and in which fancy ran wild in the strange and grotesque designs of the capitals and other ornaments. Such a style, which seems to have developed its characteristics as early as the ninth century, had much in common with the Northern Romanesque, to which it doubtless suggested ideas. The interior of Saint Ambrose at Milan, so far as it remains untouched by the changes of the twelfth century, looks like a rude foreshadowing of one of our own Norman buildings. It must have been a distinct reaction, a conscious falling back on the more graceful forms of earlier times, which led to the restoration of the basilican type at Lucca and Torcello. The massive and cavernous forms of Saint Ambrose and Saint Michael were left to the nations beyond the Alps, and Italy again fell back on forms essentially the same as those of Spálato, till her national architecture perished in the vain attempt to transplant the Gothic of the North to an unkindly soil.

Beyond the Alps, the national styles which arose at this time differ, as I have already said, far less in their detail than in the general design and composition of their buildings. It is true that as the traveller goes northward, he finds detail growing less and less classical at every step. Aquitaine is more classical than France, France than Normandy, Normandy than England. But these differences are, after all, not very important. They are hardly more striking than the local varieties of style which we find in all times and places; the component parts of an Aquitanian building would often seem quite in their place in England. But the general effect and spirit of an Aquitanian church, with its wide and often aisleless body, its cupolas, its barrel-vaults, its pointed arches introduced when there is not the slightest sign of approaching Gothic, make the buildings of Southern Gaul as unlike as possible in general effect to anything to which we are used, in Northern Gaul and in England. Where arcades are used, the rectangular pier, but in a less massive form than those of Germany, is preferred, as in the great abbey of Saint Sernin at Toulouse; a church which, built in the eleventh century, exhibits an earlier form of Aquitanian art, and which in its own class may almost rank with Durham and Pisa.

Meanwhile in Northern Gaul the familiar Norman style was growing up. We can trace its growth in its own country from churches like Bernay and Jumièges, where traces of the Primitive style still linger, to the fully developed Norman of William's own St. Stephen's, and thence to the more gorgeous forms of Bayeux in the next century. The introduction of this style into England is, as I have already said, a matter of recorded history. It made its first appearance in Edward's church at Westminster, which was rising in the new style while Odda was building his lowlier minster at Deerhurst in the style of his forefathers. The Norman Conquest confirmed the victory of the new fashion, but the two styles went on side by side almost to the end of the eleventh century. The churches of bishops and abbots, the castles of the king and his nobles, were built in the style of the conquerors, while the primitive forms of the vanquished still lingered on in lowly parish churches. Coleswegen at Lincoln built his churches in the ancient style, while the Norman minster and castle were rising above his head.[1] Ealdwine repaired the churches of Benedict Biscop at Jarrow and Monkswearmouth in a style not widely differing from that of their first founder.[2] And he did so barely twenty years before William of Saint Carilef began to crown the peninsular height of Durham with the noblest work of Northern Romanesque. The existence of two styles of architecture side by side, just like the existence of two languages, of two legal and social systems, is exactly what we should look for in such a state of things. Yet so hard is it for some minds to understand the nature of an argument that the fact has actually been turned the other way. The fact that some "Saxon" buildings are later than the Norman Conquest, as some Norman buildings are earlier, has been used to show that England had no distinct style of architecture before the Norman Conquest. Yet the fact that Coleswegen and Ealdwine built their churches in the elder style, while buildings in the newer style were rising everywhere around them, is a far more distinct proof that there really was a distinct earlier style, and that men were conscious of the difference, than any number of examples actually of earlier date.

By the end of the twelfth century, then, the new local forms of Romanesque were fully established in most parts of Western Europe. The relations of these styles to the contemporary Saracenic architecture, the stages of the Transition between Romanesque and Gothic, that is, the steps by which the architecture of the round arch gave way to the architecture of the pointed arch, hardly form part of my present subject. My business has been to plead for Romanesque as a true and independent style of architecture, to plead for it as a style of unsurpassed historic interest. I know not what may be the feelings of others, but to my own mind Romanesque is the most historic of all styles. A Romanesque church or castle always seems to carry me nearer than any other building to the men who dwelt or worshipped within its walls. In a grand Gothic building, the purely artistic effect is so perfect, so entrancing, that it is hard to turn our thoughts from the art to the history. Take the two minsters at Rheims. The metropolitan church is one of the noblest triumphs of human skill; for that very reason it is less easy to enter thoroughly into its historic interest than it is in the Abbey of Saint Remigius. In the cathedral, the perfect harmony of pillar and arch and vault, the glorious colors of the windows, above all at the happy moment when the rays of the setting sun stream through the great rose, hardly leave us the will to think of the long series of pageants on which the painted forms in those windows have looked down, or even on that great day of all when the Maid stood, with her banner in her hand, beside the King whom she had led thither to his crowning. In the abbey, grand and solemn, yet strange, uncouth, and disproportioned, every stone seems to speak of its historic associations. Pope and Cæsar, Bishop and Abbot, rise up before us almost in their personal presence as they came together on the great day of its hallowing. We go back even to days earlier still, to days before the foundations of the present pile were laid, to the long array of princes and prelates who found their resting-places on that spot, and to the one day in all recorded history when a lawful Emperor received the crown of Augustus within the limits of the Western Kingdom. In the like sort, William and Lanfranc live at Caen, Odo lives at Bayeux, and William of Saint Carilef lives among the mighty arches of Durham, while later founders have reared works so perfect in themselves that we hardly stop to think of those who reared them. In a wide view of history, no time has a higher interest, no time is richer in instruction, than the long ages which pass on, like a stately procession, from the days of the Cæsars of Illyricum to the days of the Cæsars of Hohenstaufen. And alongside of the study of law, and language, and religion through those long and eventful ages, the study of their material works will form no unworthy companion. From the marble campanile of Pisa to the rude tower of Saint Regulus overlooking the Northern Ocean, each building has its tale to tell us: each brings home to us, in a way which earlier and later buildings hardly can bring home to us, the thoughts and deeds of the men who lived and died, who fought and wrote, beneath their shadow.

[1] See Norman Conquest, iv. 219.
[2] Ibid. iv. 666.

THE INTER-OCEANIC CANAL.

IN the January number of the *North American Review* appeared an article covering some fourteen pages, by M. Ferdinand de Lesseps, on the Inter-Oceanic Canal, wherein he discusses the surveys already made by the United States Government, afterwards speaking of the later French expeditions under MM. Célier, Wyse, and Reclus, at the Atrato-Tyra and the Aspinwall-Panama regions. Then, in a popular style, he endeavors to explain the decision of the International Congress at Paris, and why the Panama line, recommended by Lieutenant Wyse, was adopted rather than that from Greytown to Brito via Lake Nicaragua, favored by the American delegates.

In the February number of the same review appears a counter article of fifteen pages by Admiral Ammen, U. S. N., looking at the subject from the Nicaraguan point of view, analyzing and rather demoralizing many of M. de Lesseps's statements. Both gentlemen have, however, made somewhat broader assertions than circumstances warranted (evidently unintentionally), thereby weakening their case, and at the same time laying themselves open to criticism.

The vital difference of opinion is simply whether it is best to construct a canal with locks or not. If it is proper, then it is competent to consider the expediency of the Nicaraguan route, or some modification of it. If locks are not permissible, the Aspinwall-Panama route may be the best or may not: it is *possible* to construct a canal on any of the routes offered; whether it is *wise* to do so remains yet to be proved.

M. de Lesseps starts off with the assertion that the Government of the United States has expended five millions of dollars on its exploring expeditions, then urbanely tells us that these expeditions have been under the direction of its most distinguished nagivators and engineers, have been very well conducted, etc. Admiral Ammen steps up promptly and suggests that ninety thousand dollars would be nearer the true figure, and backs up his remarks with apparently convincing details. In regard to the other portion, how does M. de Lesseps know about the competency of the navigators and the engineers employed? Did he ever examine them? Admiral Ammen, Commanders Selfridge and Lull, Lieutenant-Commanders and Lieutenants Hubbard, Hitchcock, Collins, Moser, etc., are naval officers, educated at Annapolis, where the course of civil engineering is limited. They are doubtless fine naval officers; they are certainly highly cultivated and agreeable persons to meet, they are unquestionably industrious and painstaking, but have they ever been heard of before as civil engineers competent to pass judgment upon or locate a canal costing in round numbers a hundred millions of dollars? Mr. Men-

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ocal is the only professional engineer who makes statements on the American side.

On page 3 M. de Lesseps says: "In the examination made of different projects in the United States, the only plan thought of has been to make use of inland waters for constructing a maritime canal, and they have entirely neglected to study the methods by which they would secure a constant level of sea water for the purpose of navigation in a channel, from one ocean to another." Admiral Ammen shows distinctly that this is at variance with the true facts of the case, and from M. de Lesseps's own article it seems to be a palpable error.[1] Admiral Ammen then states that the special commission, composed of able engineers, appointed to personally inspect the routes over which it was supposed actual lines of location existed, made inspections to form an opinion as to the relative cost of execution, and found that the "Nicaragua route located by Commander Lull presented all the elements of calculation for an engineer." What does this mean? What are the elements of calculation referred to?

Admiral Ammen writes: "In April of 1866 a M. Gogorza sought my acquaintance and informed me that he knew a low line of levels across the Isthmus of Darien. . . . . During the fall of 1876, after I had prepared a paper which was read, October 31, before the Geographical Society of New York, the Secretary of State presented me a pamphlet by M. Gogorza, who at length had given the world his great secret." Mr. Ammen must have fallen into error here, for the pamphlet in question was in possession of the Selfridge expedition of 1869 and 1870, and discussed at that time. [The writer understands that it was sent by the Emperor Napoleon to President Grant, and from him, by special messenger, to the Selfridge expedition, then at the Isthmus.] M. de Lesseps, on page 6, says: "As the plan of a canal without locks could not be realized at this place [Atrato-Tyra] I decided that some other locality must be sought for. It was then that Mr. Wyse and M. Reclus, availing themselves of the resources offered by the Society of Explorations, presided over by General Tün, and accompanied by the staff already mentioned, as well as by M. Werburghe, a very distinguished young traveller, who went with them at his own expense, set out on their expedition. They returned with the outline plan of a canal from the Gulf of Limon to Panama, without locks, crossing the Cordilleras either with a tunnel or a surface cutting.

"These explorations furnished all that was wanting to an exact knowledge of the American Isthmus throughout its entire length. From the combined labor of Americans and Frenchmen it was now possible, with entire certainty, to solve the question of an inter-oceanic canal." On page 8, "Moreover, is it to be supposed that the accomplished American engineers who selected the line Colon-Panama for the construction of the railway did so at hap-hazard? Was it not, on the contrary, because they recognized at the outset that this was one of the least elevated points on the Isthmus, and therefore the best adapted for their purpose?" This is exceedingly crude, and probably of little real value.

To say that the slight exploration made by these gentlemen furnished all that was wanting to an exact knowledge of the Isthmus throughout its entire length means one of two things — either that nothing whatever was wanting, or that the entire explorations are worthless. As for the Panama Railroad line, the writer does not remember at this time about the actual surveys made for that corporation, but is under the impression that the Panania Railroad grant, permitting them only to construct railroads and canals across the Isthmus of Darien and Panama, has, since the location of the railroad, been carried as far down the coast as Cape Tiburon, and by a line from that point to the junction of the Chucunaqua River and San Miguel, indicating that the corporation would, at all events, a little rather not have any canal or railroad started within these limits without their permission. The engineers of the Panama Railroad should be better acquainted with the relative values of routes near their railroad than other people, but to suppose that these gentlemen recognized at the outset that this was one of the least elevated points on the Isthmus seems as probable as that they were influenced in their choice by divine revelation. As a fact, the Isthmus has never been surveyed. Some few lines have been roughly run from tide-water to tide-water, but of the six hundred and odd miles between Greytown, the proposed Atlantic station of the Nicaragua route, and the Napipi River, proposed by Commander Selfridge, nobody with a true knowledge of the facts can claim that over five or ten miles have ever been thoroughly reconnoitred. M. de Lesseps's statement that an exact knowledge of the American Isthmus, throughout its entire length, has been obtained, deceives nobody except those persons who do not keep posted. His opinion as an engineer, particularly as regards canals, in general, ought to be, and doubtless is, very valuable; but statements like the above are unsound and cannot fail to be detrimental to his professional record.

The United States coast-survey officers who accompanied the expeditions can probably give more valuable opinions than any one, — perhaps than Mr. Menocal. Not one word has been uttered by them, or by the army engineers, to show that they consider that the preliminary work has even been carried on in the proper manner — much less that data have been obtained sufficient to base an opinion on that deserves confidence.

A canal will be built, unquestionably; it may be at Colon-Panama, possibly at Nicaragua; but neither should be seriously considered until several years of accumulated field notes, taken by competent engineers on some comprehensive plan of the entire Isthmus, shall demonstrate, beyond a peradventure, the superior fitness of one particular location over all others. Up to the present time the Panama and Nicaragua lines have been more carefully surveyed, and seem less expensive than any others — that appears to be the sum total of our knowledge.

Mr. Menocal and all the others deserve great credit for their efforts; but it is difficult to understand how engineers, working under the direction of naval officers, no matter how competent, will ever be able to obtain results sufficiently valuable to definitely fix the preference of one route over another.

It may be worth while here to refer to perhaps the most successful — certainly the best known — of American engineers, James B. Eads.

In the daily papers of January 21, under Washington news, appeared the following paragraph: "Mr. Wells (Democrat), of Missouri, introduced a bill incorporating the Inter-Oceanic Transit Company. It creates J. B. Eads and associates a body corporate, to be known under the name of the Inter-Oceanic Transit Company; authorizes such company to acquire such rights of way, by negotiation or treaty, as it may need to accomplish its object; secures to such company, if need be, the coöperation of the United States; provides that it shall commence the work within two years, and complete it within seven years, from the passage of this act, in which case no rights shall be granted by the United States to any other company or corporation within fifty years; authorizes the President to detail two ships of war to assist said Eads in making such full and complete details as may be deemed necessary, and appropriates $2,000,000, to be immediately available to defray all expenses attending such surveys." Mr. Eads is known to favor a railroad rather than a canal, not perhaps so much from an intimate knowledge of the Isthmus, as on the general principles that he thinks the idea practicable. The scheme has been pronounced entirely visionary on all sides; but inquiry shows that the opposition consists simply in the fact that it has never been done yet. Now everybody, Admiral Ammen included, will acknowledge that, other things being equal, a thorough cut canal would be preferable to any arrangement with locks, — it would be exceedingly interesting to suddenly find both canal schemes entirely eclipsed by a railroad. B.

[1] We are disposed to differ here. It did not seem to us that Admiral Ammen made out his case very well. — Eds. American Architect.

FRESH AIR IN OUR DWELLINGS.[2]

In attempting to combine in one apparatus the open fire-place and the modern furnace the first question governing the form of the apparatus which must be answered is, How much space should be allowed for the circulation of fresh air about the radiating or heating surfaces?

Deprived of food we can live on for weeks, but deprived of air we die in three minutes. Nature has, in the construction of our bodies, devoted half the space in the main trunk to the machinery for the supply and distribution of fresh air. The working of this machinery heaves the entire frame, giving it the only regular and constant motion apparent, and producing the only regular and constant sound audible to our senses. It occupies the central position in the body and has in its service the two most prominent features in that seat of honor, the face; that is, the nose and the mouth. Yet in our artificial habitations the machinery devoted to ventilation, if allowed a place at all, is treated with contempt and crowded into whatever chance space may be left for it after the work of building is done. Its inlets and outlets are disguised or hidden as things of which we should be ashamed rather than treated after the example set us by nature, as the leading decorative features of the edifice.

In the process of breathing, the blood is exposed to the action of atmospheric air, during which exposure it undergoes certain changes. "The blood from the right side of the heart when it enters the lungs is of a dark red color. It is then dispersed in a state of most minute subdivision through the ultimate vessels of the lungs, and in these vessels is brought into contact with the atmospheric air, when it becomes of a bright red color. In other words, the blood changes in the lungs its *venous* appearance and assumes the character of *arterial* blood. The blood, thus arterialized, returns to the left side of the heart, from whence it is propelled through the arteries of the body. In the minute terminations of the arteries the blood again loses its florid hue, and, reassuming its dark red color, is returned through the veins to the right side of the heart, to be exposed as before to the influence of the atmospheric air, and undergo the same succession of changes." (Prout.)

"The water given off by the lungs is not pure water, such as is liberated in the process of distillation or evaporation, but is contaminated with the most offensive animal effluvia. M. Leblanc states that the odor of the air at the top of the ventilator of a crowded room is of so noxious a character that it is dangerous to be exposed to it even for a short time. If this air be passed through pure water the water soon exhibits all the phenomena of putrefactive fermentation. The water of respiration, thus loaded with animal impurities, condenses on the inner walls of buildings and trickles down in fetid streams. In the close and confined dwellings of the poor this vapor condenses on the walls, the ceiling, and the furniture.

[2] This paper by the writer of the Open Fire-Place articles will be incorporated with those articles in their separate form.

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and gives that permanently loathsome odor which must be familiar to all who take sufficient interest in the poor of large towns ever to enter their dwellings. Take up a chair, and it is clammy to the touch, and the hand retains the ill odor.

"How much disease and misery arises from this cause it would be difficult to state with any approach to accuracy, because the causes of misery are very complicated. In the evidence taken before the House of Commons, on the health of towns, in the year 1840, the medical witnesses stated that scrofulous diseases were the result of bad ventilation, and that in the case of silk-weavers, who pass their lives in a more close and confined air than almost any other class of persons, their children are peculiarly subject to scrofula, and softening of the bones. Dr. Arnott stated that an individual, the offspring of persons successively living in bad air, will have a constitution decidedly different from that of a man who is born of a race that has inhabited the country for a long time; that the race would, to a certain extent, continue degenerating. Defective ventilation deadens the mental and bodily energies, it leaves its mark upon the person so that we can distinguish the inhabitants of a town from those of the country. This witness, in alluding to the want of knowledge among all classes on the subject of ventilation, states that he had heard at the Zoölogical Gardens of a class of animals where fifty out of sixty were killed in a month from putting them into a house which had no opening in it but a few inches in the floor. 'It was like putting them under an extinguisher; and this was supposed to be done on scientific principles.'" (Tomlinson.)

"One of the most obvious effects of an insufficient supply of air is the discomfort occasioned in those who are not habituated to the deprivation. This discomfort is an evidence of positive injury, and may increase till headache, prostration of strength, gastric disorders, and fainting occur. Closeness of air, not producing such marked symptoms, may cause dyspepsia and impairment of the general nutrition, — symptoms which are now recognized as related to the development of phthisis." (Lincoln.)

The amount of pure air required for comfort, as judged of by different persons through their senses alone, varies with individuals, and with the same individual at different times, and this to such an extent that their judgment cannot be relied upon. An atmosphere which may seem to one perfectly pure and agreeable, may to another, with a more sensitive nose, be extremely nauseous. "It is curious," says Lange in his work on ventilation,[1] "that the peasant (whose custom of living in the air of the open fields would make it seem most incredible) should be often the very one to insist upon an atmosphere indoors actually *dense*. In the winter the entire household, as well as a part of the stock of domestic animals, live together in a single small room, where all the cooking is done, and the peasant smokes his far from savory pipe. He seems to feel himself quite at ease, only when, as the saying goes, '*he can cut the air with a knife.*'"

It is necessary, therefore, to refer to a more competent judge than our sense of smell in investigating the purity of the air we breathe.

The air of an ordinary living-room is altered by the occupants in two ways. First, by a *change in its constituents*, the oxygen being slightly diminished, while the carbonic acid and moisture are considerably increased; and second, by an *addition of matter* in the form of organic exhalations whose chemical composition and proportions are still unknown.

The chief constituents of air are nitrogen, which forms its largest part, oxygen, and carbonic acid. The former need not be considered in connection with ventilation. The air of a dwelling-room contains no more nitrogen than that of the open fields.

The relatively small abstraction of oxygen renders the consideration of this component also unimportant. The carbonic acid, though not the injurious element of the air of our houses, impoverished by ordinary respiration, furnishes the best means now known of measuring its impurity. Pettenkofer found that he could remain for hours in air containing 10 parts per thousand of carbonic acid without inconvenience. Forster states that he experienced no trace of difficulty in breathing during a stay of ten minutes in air containing 40 parts in a thousand. Hirt says that workmen in mines do not suffer as long as the proportion of carbonic acid does not exceed 7 parts per thousand. In our dwellings such high proportions of carbonic acid are obtained only in exceptional cases.

The harmful element of air consists in the *organic impurities* coming from respiration, as well as in the carbonic oxide of combustion, and the organic impurities are particularly injurious when they are left to decompose. These impurities are generally found to exist in direct proportion to the amount of carbonic acid present, so that the latter serves, in default of a more direct method of measurement, to determine the amount of the hurtful ingredients.

As for carbonic oxide, it is a highly poisonous and dangerous gas, one part in a hundred of air being sufficient to destroy animal life. "The chemist Chenot, having accidentally inhaled a single breath of [this] gas, fell on his back to the ground as if struck by lightning; his eyes were rolled in their sockets, and his extremities drawn up. In a quarter of an hour external sensation returned, with a feeling of cold and suffocation. A heavy sweat covered his whole body, while a peculiar hyperæsthesia of the brain existed.

"Carbonic oxide is known to be often present in minute quantities in the air of inhabited rooms, proceeding from defects in furnaces or stoves, and to some extent from the imperfect combustion of illuminating material. Being a frequent ingredient of illuminating gas, it may enter a room through a leak or through the sides of flexible tubes. It has been found in tobacco smoke. Many people suffer from small amounts; the effects commonly attributed to its action in ordinary life are giddiness, headache, and prostration of strength. It exists in the smoke of a glowing candle-wick. Death occasionally results from the careless use of braziers containing charcoal, so commonly used in Southern Europe; King Alfonso very nearly lost his life from this cause a few years ago, in Spain. The danger of closing the chimney-draught of a stove arises chiefly from the probability that quantities of this gas will be thrown back into the room. The fuel (anthracite, wood, coke, charcoal, soft coal), which burns readily and without carbonic oxide while abundant fresh air is supplied, gives rise, when the draught is checked, to the half-oxidized product (CO instead of CO_2). In no case can we say that a given fire produces no carbonic oxide. For example, in a bed of live coals ten inches deep, we know that it exists in abundance in the central layers where oxygen is deficient in amount, and that it issues in quantities from the upper layer, where, again meeting with air, it becomes further oxidized or burnt, making a blue or yellowish flame, characteristic of the perfect combustion of anthracite and charcoal, and forming carbonic acid."

"Air may, so far as its effect upon health is concerned, be considered pure and good which contains not more than 6 or 7 parts in ten thousand of carbonic acid. A good rule is that it should contain under one part in a thousand. To attain an absolute purity would be impossible, even with the strongest ventilating currents, both because the outer air is itself not absolutely pure, containing from 2 to 7 parts of carbonic acid in the ten thousand, according to the locality; and because the organic product of respiration clings to the walls, ceilings, and furniture so pertinaciously that it may be said to give to every place its peculiar and characteristic odor. Boston Public Garden showed, in May, by four analyses, 3 parts in ten thousand." (Storer.)

[1] Zur Frage der Ventilation mit Beschreibung des minimetrischen Apparates zur Bestimmung der Luft verunreinigung. Zurich, 1877.

THE ILLUSTRATIONS.

CUSTOM-HOUSE, ST. JOHN, N. B. MR. THOMAS S. SCOTT, CHIEF ARCHITECT, DEPARTMENT OF PUBLIC WORKS, OTTAWA, CANADA.

A VIEW of the other front and the plan of this building were published in the *American Architect* for October 4, 1879.

DESIGN FOR A COUNTRY HOUSE. MR. W. A. BATES, ARCHITECT, NEW YORK, N. Y.

A GROUP OF THREE HOUSES, MONT CLAIR, N. J. MR. H. H. HOLLY, ARCHITECT, NEW YORK, N. Y.

DESIGN FOR A CITY HOUSE. MR. EDGAR C. CURTIS, ARCHITECT, BOSTON, MASS.

The materials are brick and stone, which latter forms the capitals and bases of the columns and string courses and lower story. The house is designed in sixteenth century French Renaissance, of which there are so many beautiful examples in the southern parts of France, at Orléans, Tours, Blois, Chambord, etc. The plan is one used throughout Paris in all the first-class houses, but adapted to the American ideas of comfort for one family. Generally a stable occupies the end of the lot, but the narrowness of the front almost precludes this arrangement, not to mention the building laws in force in certain parts of the city. It is said that in New York there are several examples of city houses on this plan.

CORRESPONDENCE.

THE CASTLE OF HEIDELBERG. — FRANKFORT-ON-THE-MAIN. — THE ROYAL PALACE AT WURTZBURG. — TIEPOLO AND HIS WORKS.

WURTZBURG, BAVARIA.

BEFORE describing this fine old town I must speak of two or three other places which I visited on my way here, and which it would be high treason for an architect to pass by; but I acknowledge frankly that I can offer only sketches of these places which will be as hasty as were my own flying visits to a few of the many towns which are scattered all over this part of Germany. So much has been written of Heidelberg, and its romantic site has been so often described, that I am tempted to pass it over, but its castle, quite apart from its picturesqueness, claims our attention as the most important example of the early Renaissance on this side of the Rhine. Of the original capital of the Palatinate and the buildings of its powerful Electors, little was spared by the troops of Louis XIV., in 1693, the castle then being reduced to ruin. The town, now containing some 22,000 inhabitants, lies in the narrow valley which the Neckar has worn through the overhanging hills. It is a steep climb up to where the castle stands boldly out from the hill-side, but once there pretty shady walks lead to the great terrace, from which there is a beautiful and famous view of the castle and of the valley opening into the wide plains beyond. Passing under the massive square tower which defends the entrance to the castle, one enters a large

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regular court, surrounded by buildings of varying dates, the most interesting being two façades at right angles, — one built in 1556 and the other fifty years later, — whose dimensions are respectively 26 metres long by 14.50 high, and 27 long by 22 high. What the Château of Chambord is for France, the Certosa of Pavia for Italy, and the Town-Hall of Seville for Spain, these feudal walls are for Germany. The early Renaissance of each of these buildings exhibits striking national characteristics. The French never abandoned the bold and beautiful *silhouettes* which the architects of François I. taught them to raise against the sky; the Certosa, in spite of the delicate carving of the style, reveals the Italian love for plain surfaces and marble panels; while the Spaniards, in their example, gave free play to their southern fancy and profusely chased their walls, so that it was actually called "silversmith's work." Here, also, in these two façades of Otto Henry and Frederick IV. will at once be recognized in their rich ornamentation that German perfection of workmanship which tempted them aside to mere feats of mechanical skill.

The earlier of these façades, that built by Otto Henry, is generally considered the finest example of Renaissance in Germany. This opinion must have become current at a time when all architecture was ranked according to its resemblance to Vignola's orders; but judging from a less prejudiced point of view, the wing of Frederick IV. is the finer, as more original in conception and more consistent in detail. The former building, with its three stories divided by entablatures supported upon pilasters, and its prevailing horizontal lines, is in its general aspect a bastard Italian offspring, though the florid carving in high and sharp relief above the windows and in the frieze is thoroughly German. The entrance is under the most exuberant doorway, with caryatides and a confusion of carving. The other and later building at first sight seems curiously enough to show a relapse into a Gothic sentiment. Its columns and pilasters are carried up as buttresses, and the entablatures are broken around them, while two great gables with curved outlines destroy all remaining classic reminiscences. The influence, however, here at work was probably not pure Gothic, but that of the French Renaissance, which for a long time made the classic architecture yield to northern forms of construction, and which at this period had completed its finest monuments. It is curious, also, that the classic allegorical statues of the first façade are replaced here by ones which are of true mediæval character, being portraits of the Palatine counts and their relations. It was, perhaps, the desire to represent with impartiality sixteen personages, that induced the architect to place niches and statues on the outer sides of the bays which gables surmount, and to place a buttress and its pilasters in the axis, thus reversing the natural and appropriate positions. The design, however, is beautiful and imposing in spite of much trivial detail. These details are carved and undercut with marvellous precision and skill; but the effect is that of wood-carving, and stone is not treated as such, while over all, even in really beautiful forms, is that Teutonic dryness, which is so unsympathetic that at first sight it obscures what is often admirable in design. Perhaps our worthy teetotalers in America will think this dryness is most lamentably lacking in other Teutonic characteristics when they are told that the celebrated "great tun" in the castle wine vaults holds 334,000 litres, and is 9.60 metres long, and with 6.90 metres for its central diameter! The interiors of the various buildings composing the castle contain nothing of interest, and of the wing of Otto Henry only the façade above described remains, without the roof or floors.

Two or three hours by rail from Heidelberg took me to Frankfort-on-the-Main, where I expected to find mediæval houses; but alas, I was a generation too late, and the picturesque old streets, such as Prout loved to draw, have disappeared before the requirements of a bustling modern city of some 100,000 inhabitants. The sombre, narrow "Street of the Jews," formerly so celebrated, has been pulled down, with the exception of a few black-browed houses which seem to scowl at their new neighbors. Few of the many Jews who have built up great fortunes in this city of finances have cared to preserve the houses of their ancestors; but the plain old house of the founder of the Rothschild family — I might almost say dynasty, such is their power throughout the world — is carefully preserved by his descendants. The cathedral, never remarkable, has lost its interest since its choir, of the beginning of the fourteenth century, which was burned down in 1867, has been rebuilt. Its lofty octagonal lantern is, however, a fine Gothic example. More historical than architectural interest here is attached to the restored Hall of the Emperors in the town-hall; for it will be remembered that most of the German Emperors were elected, and many of them crowned, at Frankfort. It is disappointing to find so little to recall those splendid ceremonies. Instead we turn to the modern Bourse and to the nearly completed theatre, to remind us that the city is being "improved." A new gallery for the Staedel Institute has lately been built on the other side of the Main. Among the pictures are some fine Dutch and Flemish ones, but the modern school of Schwind, Lessing, Overbeck, etc., has little of interest.

About half way between Frankfort and Nuremberg lies the ancient town of Wurtzburg, which it is well worth the while of an architect to visit, for besides its palace it has preserved much of its mediæval dignity and tranquillity. This royal palace, formerly an episcopal one, was built in 1744. In spite of the rococo taste of that epoch the simplicity of the main lines and the admirable proportions of the building give it undeniable dignity and beauty. The architects of that period, however they frittered away their power in minute and ridiculous ornaments, rarely did anything mean or trivial with the masses, and here the grand lines which rule from end to end of the building, and the well-proportioned windows, prompt one to forgive the childish decoration scrawled over it, for it really seems as if in the absence of the architect a riotous troop of school-boys had climbed upon the scaffoldings and scrawled upon the walls their whimsical fancies. So much for the power of current fashions in the eighteenth century. Subsequent generations on looking back will see that since then other interlopers, perhaps not boisterous boys, but Greek-browed maidens or thin-lipped sages, have played as woeful tricks with the honest work of architects, who finally become convinced themselves that these officious vagrants are sent by the gods to give them immortality. With the appreciation of masses the architects of this period understood remarkably how to lay out the approach and surroundings of their buildings; here a spacious square precedes the large court of the palace. The entrance hall is wide and low and vaulted with a very flat elliptical vault. On the left opens the grand staircase, which, with its great hall, is one of the finest in Germany. Half way up, the stairs divide and return in two flights to the broad gallery which surrounds the hall. The architecture of this hall is really fine, at once robust and refined, and there is a striking absence of rococo ornament. One can but wonder how those riotous boys were kept out; especially when, on entering the halls beyond, they are seen to have been frantically at work, or rather at play, for never was there such an extravagant scrawling and sprawling of straggling stucco spider-like designs as on these walls and ceilings. They seem to have dipped their nimble fingers in stucco and gold — it may have been treacle — and careered about to their hearts' content. The great lunettes in the central hall are framed in the ample folds of stucco curtains, held back by cherubs, themselves stuck to the ceiling in a miraculous way. Enormous columns of stucco have brass capitals and bases, and the cornice *baroque* consoles of the same. All this is deplorable, outrageous, and in no way to be defended. One's Puritan morality is violently offended, and yet erelong that righteous indignation begins to subside. There is a subtle influence at work. It is not merely that the hall is vast, nobly proportioned, and splendidly lighted; there is over all the enchantment of exquisite color. That outrageous stucco order is of beautiful rose marble, on which the yellow brass gives a delicious note, while the lunettes and ceiling echo this chord with the loveliest harmonies. These effects are not fortuitous, nor due to the softening hand of time, but were designed by that prince of decorators, Tiepolo. In writing from Spain I spoke of his splendid ceiling in the palace at Madrid, and I confess to having visited Wurtzburg especially to see his great rival works here. Unlike other Venetians his best works are not in his native city, for neither in the Palazzo Labia nor in the churches is he seen at his best.

Among his frescoes the ceiling of the great staircase hall here is often ranked first. I was, however, disappointed to find it in such bad preservation; the ceiling itself cracking and the colors apparently darkened and injured. Yet it is a wonderful work. There is a rather flattened cl istered vault, and above the cornice are grouped in repose a procession, including characteristic types of men and animals from different parts of the world. The rest of the ceiling is chiefly occupied with clouds, with here and there allegorical figures. The tonality of the Madrid ceiling is very light and delicate, the palest and rarest blues, yellows, and rose, rendered even more delicate by the vigorous coloring of the walls, which are hung with rich crimson silk, and a most powerful note is struck by the dark bronze statues around the hall. Here the conditions are reversed. Whether originally so intended I do not know, but the walls of this staircase hall are of light stone, and the ceiling, on the contrary, is most vigorously colored with powerful accentuations. In the picturesque attitudes and accessories of the various groups Tiepolo has found fine opportunities for that tremendous *fougue* which fired him often in churches, to his injury. The central hall above mentioned has three great frescoes, more in his usual, and, I think, more successful style. The tonality of this ceiling is very light, the white plaster seeming to shine through and give transparency as the white paper to a water-color. A group of white horses seen from almost directly underneath are relieved with amazing skill against a pale sky; the group in the chariot behind them is most graceful, with the loveliest orange and pink tones. On the extreme right and left, towards the foreground, are comparatively vigorous groups, serving as *repoussée* to the blaze of light diffused all over the rest of the scene. This ceiling has the beauties and some of the faults to be found in Tiepolo's work: lovely aerial color, elegance in the drawing and the composition, a most happy combination of diffused and concentrated light, with a few crisp accents of vigorous color. On the other hand it can be said that the perspective of the figures is violently foreshortened, and that the composition, however agreeable in its lines and *clair-obscur*, is quite meaningless, and the dramatic action of the groups does not explain itself. For the first I would say that when vertical perspective is introduced at all, it is better it should be boldly carried out, and the second objection seems to me a great merit. A ceiling should be decorated as *intellectually* as possible, — that is, there should be no attempt to express abstract ideas, nor to present a seriously interest-

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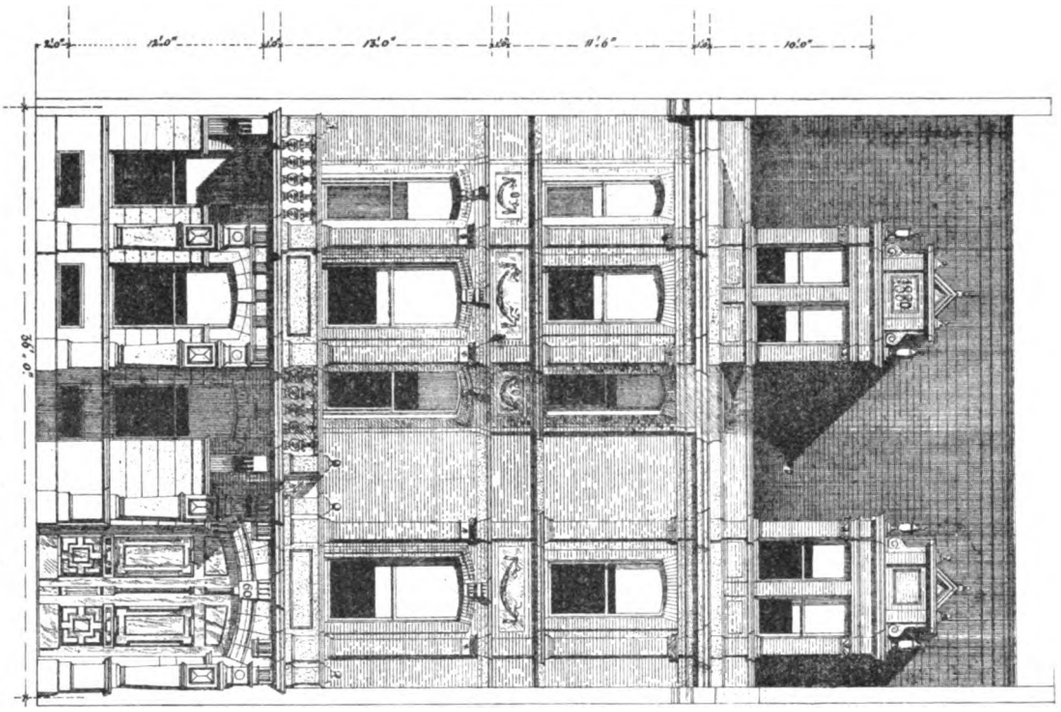
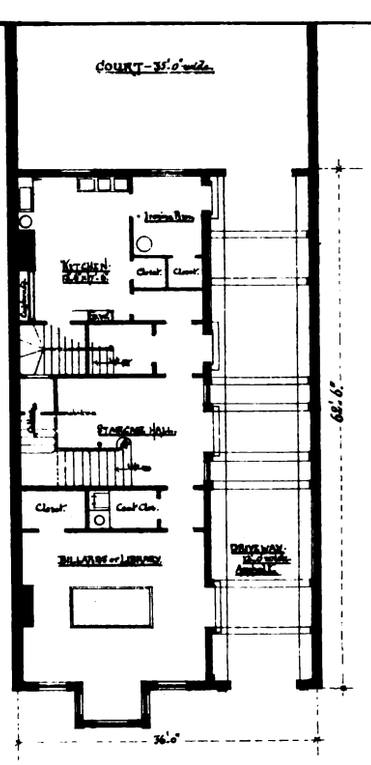
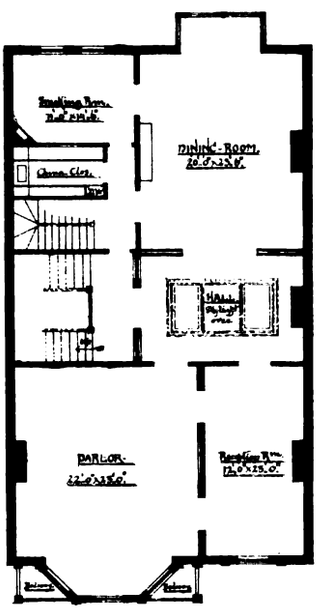
STUDY FOR THE FRONT OF A HOUSE
WITH A CARRIAGE ENTRANCE
on the French system - Lot 36½ front.

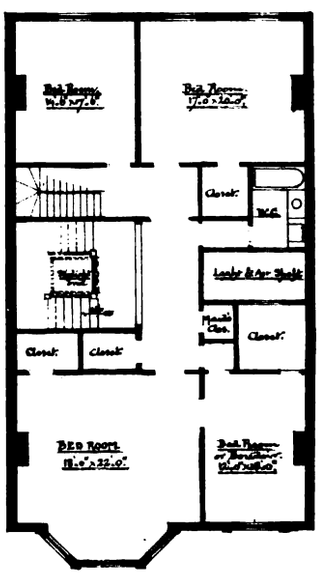




GROUND FLOOR PLAN.
Cellar under.



FIRST FLOOR PLAN.



BED ROOM FLOOR PLAN.
Attic over with 3 bed Rooms.

SKETCH PLANS A HOUSE WITH CARRIAGE ENTRANCE
on the French system - Lot 36½ front.

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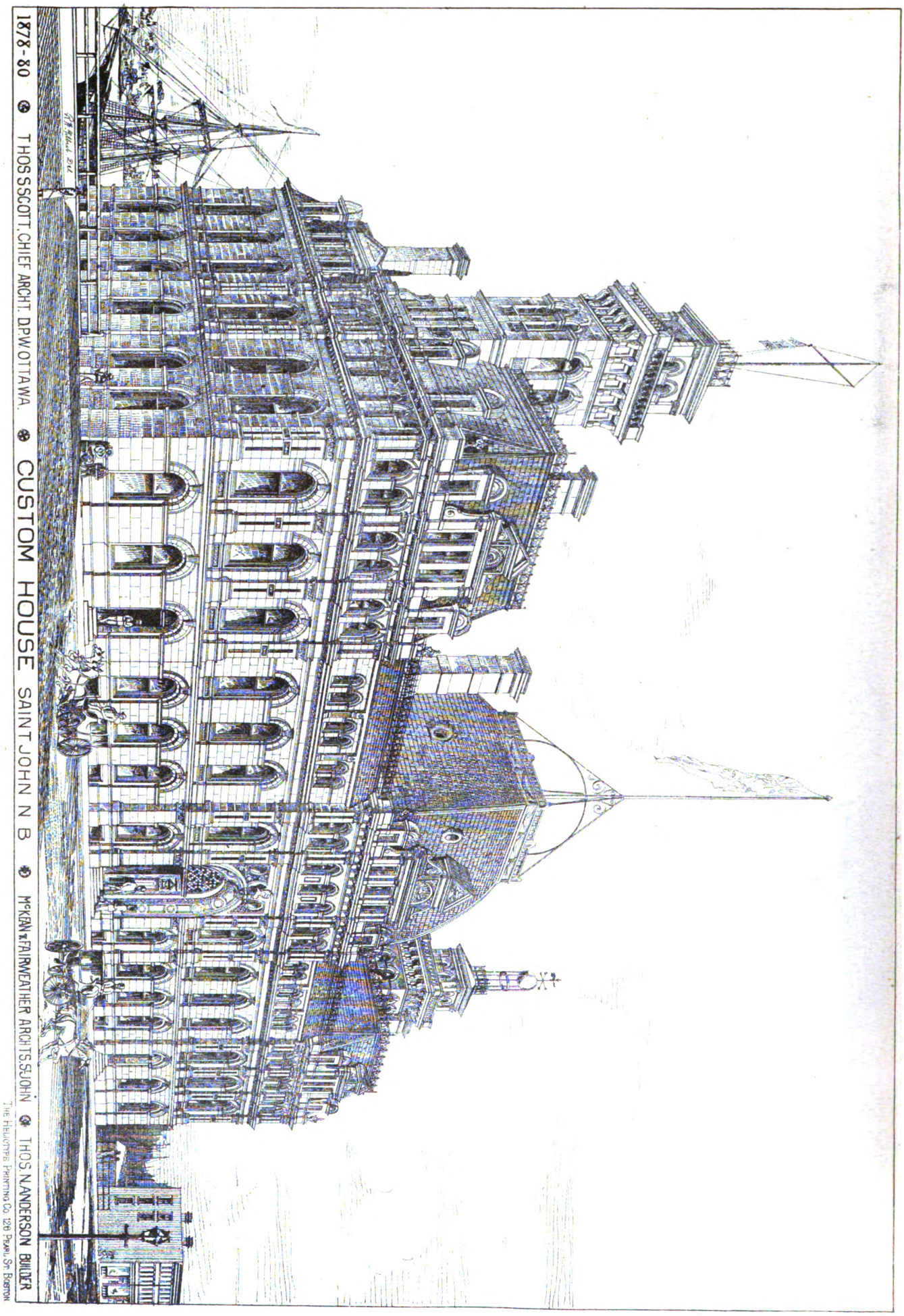

1878-80 ❁ THOS SCOTT, CHIEF ARCHT. DPW OTTAWA. ❁ CUSTOM HOUSE SAINT JOHN N B ❁ McKAY & FAIRWEATHER ARCHTS. ST JOHN ❁ THOS. N. ANDERSON BUILDER

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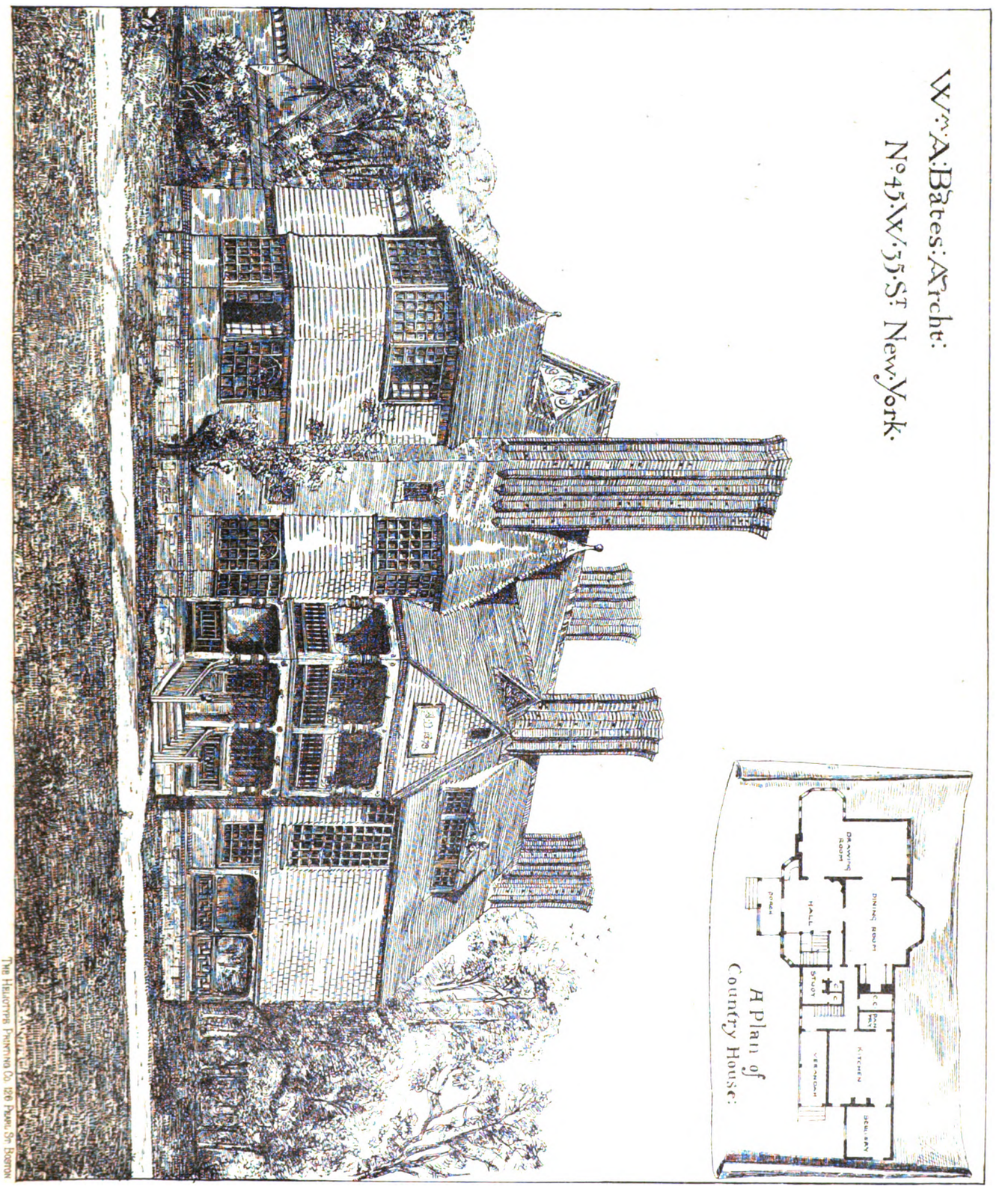

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A Plan of Country House.

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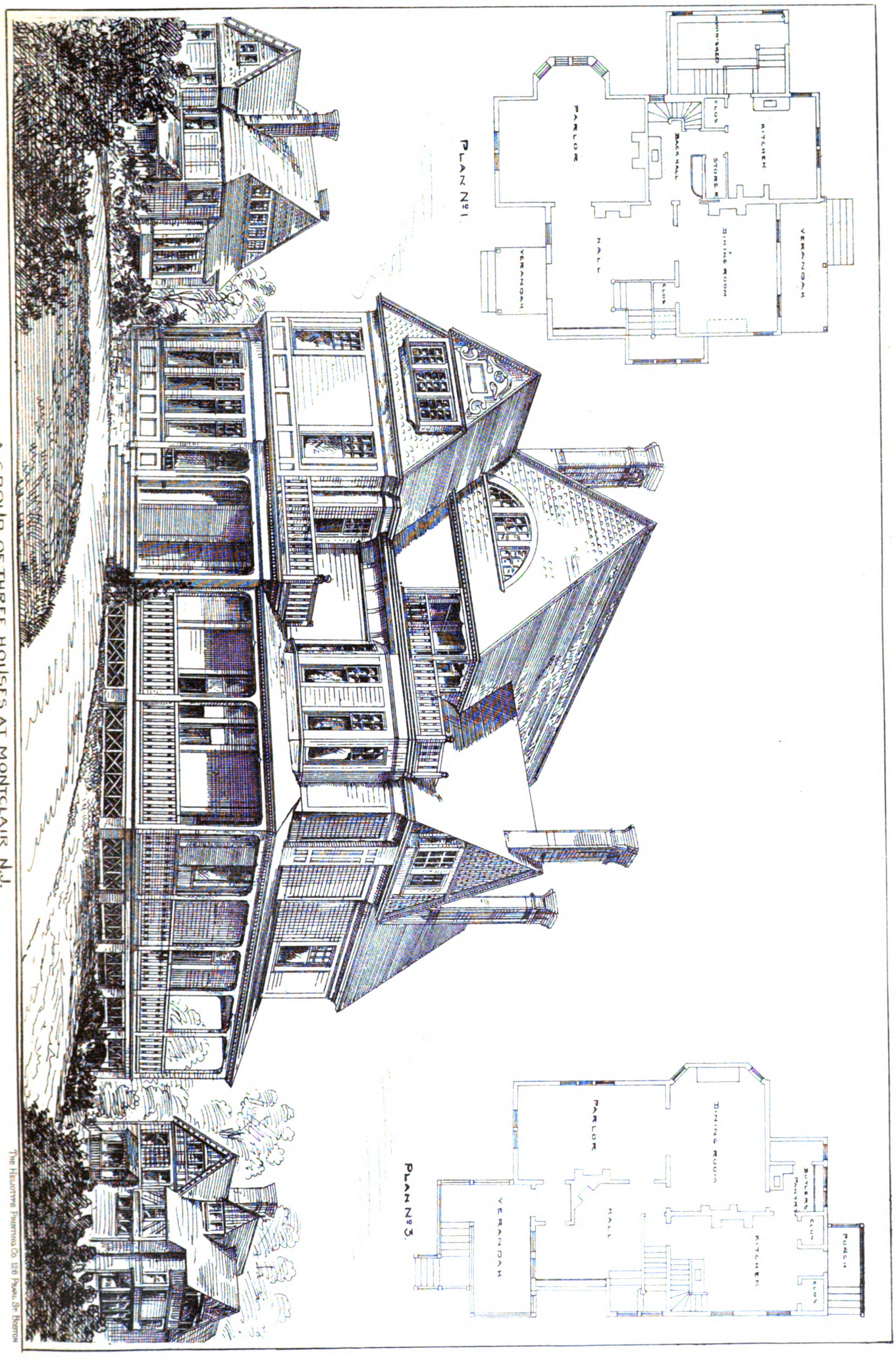

A GROUP OF THREE HOUSES AT MONTCLAIR N.J.

H. HUDSON, HOLLY, ARCHITECT, N.Y.

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ing picture, when the neck and eyes must be tortured if more than a rapid glance from time to time be given. That this was the opinion of Tiepolo is evident from the radically different manner in which he has treated the two great frescoes on the walls, — one a grand marriage ceremonial, and the other a reception of a grandee by some prince. There is here no eccentric action nor attitudes, and no attempt at effects for themselves merely. The story in each case is simply and very elegantly told. Veronese himself was never more dignified nor more the "grand seigneur." There is no *chic* in these two frescoes; drawing and color, details and composition, are all carefully studied. Alone this hall suffices to place Tiepolo among the first three or four decorative painters of the world.

His biography has never been more than very hastily studied, for his works have attracted little attention, owing to their connection with buildings in the rococo style, which artists and critics for the last half century have not thought it worth while to glance at.

Giovanni Baptista Tiepolo was born in Venice in 1697, and studied first with Lazzarini, who was a thorough master of drawing. Later he worked under Piazzetta, celebrated for his *clair-obscur*. In spite of his immense natural facility it seems that Tiepolo studied with unflagging patience and ardor for a long time directly from nature, and his talent was supplemented by great acquirements. His two sons, Giovanni Domenico and Laurenzo Tiepolo seem to have early imbibed his style and helped him in all his later work. I believe, also, that Mengozzi Colonna, an architect and decorator, accompanied them always, and to him is chiefly due the skilful drawing of the architecture often introduced in their compositions. Tiepolo painted nature only in her outward manifestations. He had no sermons to preach and no convictions to express. He painted joyously all that was beautiful and picturesque: in sentiment for the latter he has never had a rival. He took the diffused light of Veronese and struck across it the most brilliant gleams of sunlight, and this brilliant play of light upon light was his passion, and generally other considerations were sacrificed to this. Avoiding dark shadows, he gave value to his lights by rare and vigorous accent placed with consummate art, generally among the accessories with which he balanced his compositions, and which introduce often an eccentric element of bric-a-brac, out of keeping with his allegorical subjects. He attained an extraordinary skill in foreshortening, and I believe no one has ever painted flying and falling figures with such lightness and precision as he. These qualities naturally pointed to fresco as his medium, and his headlong facility found here its widest range. In his frescoes it is difficult to find one among his infinite variety of tints which is commonplace. His scheme of color was evidently founded upon that of Veronese. How much these tints are themselves rare and how much their elegance is given by contrast is not easy to decide, but he certainly made great use of complementary influence to give a delicate transparency to his tints. It is for this skill in coloring in true decorative style that I would bring Tiepolo to the notice of painters and decorators. With his love for the effects of light it is natural that he should have been a fine etcher, and he, as well as Domenico, produced a great number of plates. It is curious to note that whereas Rembrandt, who also loved *clair-obscur* above all else, blackened his plate all over to give intense force to a few concentrated sunbeams, Tiepolo kept his whole plate as light as possible, — hatching generally but once, and in one direction, — and sent brilliant light gleaming over everything by a few crisp, dark accents. Of these etchings Charles Blanc, in his life or rather sketch of the Tiepolos, speaks very highly, declaring that in them he shows qualities of a great colorist, which, however, he does not accord him in his frescoes. This latter assertion may be explained by the fact that the eminent critic (as he confesses) had only casually seen a few of Tiepolo's frescoes in Venice, and from these he could form no fair opinion of the painter's power. As I have said, the life of Tiepolo remains to be written, and it will well repay the biographer, for this brilliant painter's genius was the last spark of that splendid flame which had for so many generations fired Venetian artists. Art there had degenerated hopelessly, and it was left for Tiepolo to gather in one last triumphant effort — for his contemporaries ranked him with Veronese — all the resources of its technical traditions, and with his death, in Madrid, in 1770, the latter, too, passed away. There are in the library of St. Mark's, at Venice, some three hundred of Tiepolo's letters, which are full of historical interest, and give fascinating glimpses into the truly Venetian life at the Palazzo Labia, whose fair mistress may be pardoned for loving the reckless and brilliant painter.

I have no space left to speak of the other rooms in the palace, which are of minor importance, and I will only mention the skilful laying out of the small garden behind the palace. It is made to appear of really unknown size, so ingeniously are arranged the alleys and shrubbery, while a high semicircular terrace — the ancient town wall — is made to complete, by its varied flights of steps, its charming mystery. There are a number of churches in the town, but none of especial interest, but the general aspect of the streets is gravely picturesque. R.

GREEK ART IN BERLIN.

THE Berlin Museum of Sculpture has recently been enriched by the acquisition of the most extensive and connected work of Greek art that has come down to the modern world. It consists of a large portion of a sculptured frieze, forming part of an altar erected at Pergamos, by Attalus I., who lived from 241 to 197 B. C., to commemorate his victories over the Gauls. The subject represented is a battle between the gods and giants. The following is the history of the recovery of this ancient work and its transfer to the German nation.

In the year 1865 Herr Karl Humann, a Westphalian engineer, was employed by the Turkish Government to construct a road between the harbor and the town of Bergamah (the ancient Pergamos), in Asia Minor. Noticing how Turks, Armenians, and Greeks used the marble scattered about for building materials, and even for lime-kilns, he set about to investigate carefully the ruins of the place. He soon came upon several large slabs with sculptures in *alto-relievo*, and in 1872 presented three of these to the Berlin Museum. This led to his receiving a communication from Professor Curtius, the great Greek authority, informing him that an ancient Roman writer, Ampelius, who lived at the commencement of the Christian era, mentioned the existence at Pergamos of an altar 40 feet high, with sculptures representing a gigantomachy. At the initiative of Herr Humann, permission was then obtained from the Turkish Government to make excavations for the space of a year, the German Government providing the funds. The labor was commenced on September 7, 1878, and completed last summer, the result being the recovery for the Berlin Museum, at an inclusive cost of some £6,500, of a considerable portion of the valuable work mentioned by Ampelius.

The dimensions of the site which was covered by the construction are 123 feet square, giving a circumference of some 490 feet. Excluding the staircase space, there would remain a surface of 426 feet in length available for the sculptures. These being 7 feet 6 inches in height, the area occupied by the figures must have amounted to 3,195 square feet. In large slabs about one third of this quantity has been found, besides about one thousand fragments, many of which may yet be fitted in their proper place. Taking all the parts, large and small, it may be estimated that quite half of the enormous work will be forthcoming.

Many of the slabs found are much defaced and injured by earth, having been evidently used in bygone ages for ramparts. The Byzantines, later, employed those readily accessible in building, and, as has been said, the modern inhabitants of the district have taken whatever they could lay their hands on for similar purposes. Not a few of the slabs are, however, as good as untouched, and many more, merely coated with lime, are expected to be found well-preserved on its removal.

The work is in the boldest *alto-relievo*, many of the figures being almost entirely detached from the background. The marble is large-grained and colored, not uniformly, but varying from a blue to a yellowish shade. Gods and giants are portrayed as engaged in tremendous battle. The latter are variously represented. Some are snakey-footed and with wings, while others are of merely human form, as armed warriors. There are two groups covering eight plates — one where Jupiter holds the ægis in his left hand, and with the right hurls his thunderbolts; Athene is seizing by the hair a giant encircled by her snake, the Goddess of Victory advances to crown her, and Gaea rises from the ground in an attitude of supplication. On another series we recognize Helios coming up from the depths with his four-horse chariot, Apollo, Artemis, Dionysos, Hephæstus, Boreas, and Poseidon. The characteristic features of the works of this period, when Greek art flourished for the last time, abound in these sculptures. The vigor, the wealth of invention, the boldness of representation, and the mastery of technics they exhibit, excite the greatest wonder and admiration. The unusual prominence of the relief gives the figures almost as complete statues, which naturally enhances the effect.

Besides the gigantomachy, parts of a second frieze, supposed to have adorned the interior of the building, have been discovered. These consist of thirty entire or partly-preserved pieces, five feet high and about three feet wide. The subject of these sculptures is uncertain, but is supposed to be the legend of Telephos. A number of statues, some of which appear to belong to the altar, have also been brought to light, and a few sculptures of a more remote period, including a female head of great beauty. The edifice which these sculptures adorned, called an altar, was really a considerable portion of a temple. Herr Couze, who presides over the sculpture department of the Museum, and other learned Germans, are still on the spot, endeavoring to ascertain the plan of construction and the position the frieze occupied in relation to it.

The great portion of the slabs have already reached the Berlin Museum, but they are not yet arranged for exhibition. The authorities are, however, doing their best to place the best-preserved and most complete groups for the early inspection of the public. — *The Architect.*

CONSERVATORIES AND GREEN-HOUSES.

[From a paper read before the Leeds Architectural Association by Mr. Maurice B. Adams, A. R. I. B. A.]

WE will take the plant-house first. This is frequently made a span-roofed structure, and 18 feet wide is found to be a width which will admit of the most advantageous arrangement of fittings. It is usual to place a flat stage on either side and a stepped one in the centre, thus leaving a walk all round the house. The pipes for heating can be conveniently arranged under the side stages. A span

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roof is the best form that can be erected, as the plants, having light all round them, are not so liable to be drawn to one side or the other, and thus become of bad shapes, as they are likely to be in lean-to houses. A span-roof house should be placed with the ends north and south, as by this means each side secures an equal amount of sun. The length from end to end may vary according to circumstances, but it is generally advisable not to have one house more than 40 or 50 feet long, as by dividing it up and heating each house separately, the gardener is afforded greater facilities for growing his plants. The heating-apparatus can easily be regulated in connection with one furnace as at Kew, where one big boiler heats three or more houses.

The half-span house is the next best, and is very frequently used where a back wall exists. The light is not so well distributed as in a span, but the house has a great advantage over the lean-to house for plants. Internally, the most convenient arrangement will be to have a flat stage in the front and a stepped stage at the back. I may here say that if no other provision be made for obtaining water, warmed in proportion to the temperature of the house in which it is to be used for watering the plants, a tank or cistern should be arranged in the floor of the structure for this purpose; a trough under the passage-way is a good method.

A lean-to would be fitted in the same way; both half-span and lean-to buildings should run east to west, facing the south and rather inclining towards the east. In this country [England] the angle of 45° is, for most purposes, found the best pitch for horticultural buildings generally.

For plant-houses one foot of four-inch pipe for every 28 or 30 cubic feet of air will be found to give a proper temperature.

The intermediate house is used for growing plants that require a somewhat higher temperature than the plant-house, but not so high as the stove. One foot of four-inch pipe to about 25 cubic feet of air will answer best in this case, and in other respects the building resembles the plant-house.

The stove-house is more usually made with iron stages carrying slate shelves covered with stone-chippings, sand, or small shells, on which the pots stand, thus obtaining a soakage for the superfluous moisture after watering; and from an artistic point of view, this system of gravelling the shelves with small shells is much to be recommended, especially in ornamental houses, where the ground space should be laid out, as far as possible, in natural beds instead of devoting the room entirely to stages. If wooden stages were employed in stoves similar to those employed in the plant-house, where they are made of stout laths 1½ inch by one inch, about ⅝-inch apart, it would be found that owing to the great heat kept up and the quantity of moisture usually produced they would be liable to speedy decay. The stove may be either a span, half-span, or lean to structure. Each form has its advantages, though, all things considered, the span-roof is the best. This house is heated in the proportion of one foot of four-inch pipe to about every 20 cubic feet of air, and the same system applies to the orchid-house. These proportions must, of course, be taken as a medium guide, for it is evident that the quantity of pipe necessary to keep up a given temperature will vary according to different situations and local influences; thus houses in the north of England and Scotland will require more pipe than those in the south of England. Also, a span-roof, because it has a much greater cooling surface, will require more pipe than a half-span or lean-to, where the back consists of a brick wall, but the proportions of heating power which I have just given will be found sufficiently accurate for a basis. At the risk of being tedious, permit me to say a few words more with reference to the subject of heating, because the particulars may be of value for future reference, when a more strictly accurate rule than the above calculations is required. It has been found from careful experiments that one square foot of glass will cool 1¼ cubic feet of air per minute, as many degrees as the difference between the external and internal temperature. Therefore, having taken out the number of square feet of glass, multiply this by 1¼, which will give the number of cubic feet of air to be warmed per minute. Then proceed by the following rule: Multiply 125 by the difference between the extreme external and internal temperature, and divide the product by the difference betwixt the temperature of the building and the pipes (the latter being usually calculated as at 200°); this quotient being again multiplied by the number of cubic feet necessary to be warmed per minute, and divided by 222, will give the number of feet of four-inch pipe required to bring the building to a proposed temperature. Suppose it be required, for example, to ascertain the quantity of pipe to heat a vinery with 400 square feet of glass to 75°, and, estimating the lowest external temperature at 20°, the calculation will be as follows: 125 × 55 (difference of external and internal temperature) = 6,875 ÷ 125 (difference between temperature of pipes and house) = 55, which multiply by 500 (number of feet of air to be warmed per minute) = 27,500 ÷ 222 = 123¾, the number of feet of four-inch piping necessary.

The forcing-house is used, as its name implies, for forcing on plants, etc., before they are placed in the conservatory or other plant-houses. It is usually fitted with beds having pipes below them to heat the soil with what is called bottom heat. The beds are made with iron pillars supporting slates which form the bottom of the bed, the same material being used for the sides and ends. The air flues are formed in the wall of the building, and are so arranged in conjunction with the slate trough, so to speak, which carries the bed, that the heated air may pass up in the front as well as at the back, fresh air being admitted below in a flue, or air-drain, running from end to end, and which can be regulated at will. By this means the house can be supplied with fresh heated air when it is not desirable to open the front ventilators. And here may be said that the most usual way of ventilating buildings of this kind is by allowing fresh air to enter at the lower portion of the building, either by an air-drain or by front ventilators, which, in some cases, are also repeated below the lights in the brickwork in the form of wooden doors or flaps. The heated and vitiated air is then allowed to pass off at the apex of the roof by lifting lights worked from below. Any system which admits fresh cold air over the whole surface of the roof equally does not practically do the work so well, simply because no draught is set up, as is the case in buildings such as I have described; and in very windy weather, much cold air which is not wanted must find its way into the building, when so many small ventilators exist all over the roof, a good number of which must necessarily soon fail to fit exactly as they may do when first fixed. With regard to the pipes being carried on bearers above the ground instead of their being buried in the soil, as is sometimes done, it is worthy of note that by this means they are less subject to moisture, and less liable to corrode. For forcing-houses, about one foot of four-inch pipe to from 15 to 16 cubic feet of air will be found in good proportion.

MR. RUSKIN'S DRAWINGS.

To the Editor of the American Architect:

Dear Sir, — Before seeing Mr. Ruskin's drawings[1] curiosity was rife to know which phase of his varied pen-work would be found repeated by his pencil and his brush. We had been told a great deal about his technical ability, — especially since the Whistler controversy, — we had read a great deal about the qualities he deems necessary in the work of others, we had heard a great deal about his courses of practical advice to students, and we looked for some decisive element in his handiwork by which we might judge the value of his theories, some characteristic excellence or defect with which those theories would stand or fall. But when seen, the wisest criticism is found to take a negative tone. There is little that is original or peculiar in the work, one way or the other. It would simply be rather uninteresting could one not regard it from a psychological as well as from an artistic point of view. Looked at in this way, the catalogue is the most important part of the exhibition, — of more worth without the drawings than they without its comments. Dated, explained, and appraised by Mr. Ruskin himself, they become valuable as a most naive bit of autobiography. Hence it may be guessed that the element in his writings to which they correspond is that which brings his own individuality prominently to the front, discussing and referring to it as of like, if inferior, æsthetic interest, with Venetian arches and Turner's intuitions.

The first thing impressed upon us by this catalogue, perhaps, is the fact that a keen sense of the ludicrous is a safeguard in self-criticism of an intellectual as well as of a social kind. Such a sense seems quite absent from Mr. Ruskin's anatomy. The list begins with a couple of maps, such as we have all done in our day, neither better nor worse, save that the names are very carefully painted. It is a bit of magniloquent overstatement when Mr. Ruskin says that the painting was "an excellent discipline of hand and eye, and the lines drawn for the mountains and sea a most wholesome imitation of steady engraver's work." The next drawing, done at twelve years old, he labels "infinitely stupid, but showing steady power and will to work." The first clause is certainly true, the second no more true than it is of a thousand sheets turned out yearly from our schools and drawing-academies. A couple of more early sketches (No. 7) are explained as "interesting to me now in their proper economy of paper and their weak enthusiasm, and the fastening so early upon the Rock of Arona, afterwards drawn for Modern Painters." Mr. Ruskin sees nothing mildly absurd in the fact that they should be thus interesting to him, nothing fatuous in the belief that the public will in its turn be interested in that interest of his. This sort of complacent dwelling on his failures and deficiencies as well as his successes runs through the catalogue of his later works, as, indeed, through so many passages of his books. Failures and deficiencies being his must needs attract us, or serve as signboards to mark the limits of possible advance. What reason else could prompt the labelling of No. 83 "Study for etching after Turner's drawing. A try for truer rendering of the England drawings. Failure?"

If we turn now to the actual technical merit of the drawings we shall first be struck by the fact that there is not a *picture* among them. I do not forget that their object is instruction, — demonstration merely, — that they are intended to show the truest methods, not the greatest possible results. But a man with the executive artistic instinct makes a picture whenever he touches paper, — a picture suggested or imagined, though not necessarily developed or even explained. There has been an artistic necessity for his choosing, as he has chosen, an instinctive act of composition. No one has more thoroughly explained this than Mr. Ruskin. No one exemplifies it less than he. This would be, by itself, perhaps, a valid reason for doubting whether a different scheme of early education could ever, as he himself believes, have made him a true artist, — for I suppose that is what he means by saying: "Had I been permitted at this

[1] Recently exhibited in Boston and New York.

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time to put my whole strength into drawing and geology, my life, so far as I can judge, would have been an entirely harmonious and serviceable one," and in another place, "the power of *delineation*, natural to me only because more accurate." That he possesses small "power of delineation," in an artistic sense, — whatever may be the case in a topographical sense, — is shown in his slight sketches, which cannot certainly be described as abstracts with all the vitality preserved and emphasized, as are, for example, the dozen-stroke etchings of Rembrandt. But it is shown no less in elaborate studies, like No. 87, A Stone of my Garden Wall. With all its patience and apparent accuracy, vitality of line and color are lacking still. No one could deny, of course, that there is a great deal of cleverness in Mr. Ruskin's work, but it is the sort of cleverness that comes by trying, — not as a birthright. He shows us no spontaneous, if imperfect, childish essays, such as one usually finds from an artist born. He starts with labored imitations of other men, and ends with labored imitations of nature, — all thought out and done by rule, very evidently in the simplest sketches as well as in the elaborated work. Good form is constantly to be found, and there is good color of one kind in No. 21, Mats and Fish-Baskets, and of another and very exquisite quality in No. 69, Part of N. W. Porch of St. Mark's, and there is a strong sense of the motion and quantity of water in No. 28, Falls of Schaffhausen. But each fine quality is found by itself, — here color, here line, and here chiaroscuro. To separate them may be good *occasional* practice for the beginner. To lay violent stress upon one while hinting at the others is sometimes the prerogative of an artist specially, if narrowly endowed. But to produce cold and definite studies, now of one and now of another, one's whole life through, is not to prove one's self an artist; for the truest art must be a synthesis, more or less perfect, of its various factors. Mr. Ruskin's are, I repeat, not short-hand notes of pictures, possible or intended, but memoranda, separate and distinct, about the varied qualities that go to make a picture.

Even as lessons of method these drawings do not seem to be quite all their author claims for them. The etchings after Turner are, perhaps, the most instructive. It is hard to see in exactly what consists the excellence of the sketches (numbered 49), for example, of which it is said, "They show what I have finally adopted in manner of pencil-drawing, and I believe my pupils will find it a satisfactory one for rendering the essential qualities of form." It is interesting, again, to notice No. 85, A Photograph from Drawing of Gneiss with its Weeds. "Old drawing of Modern Painters time," says Mr. Ruskin, "which really had a chance of being finished; but the weather broke and the stems in the upper right-hand corner had to be rudely struck in with body color. But all the mass of the rock is carefully studied with good method." Oh, the wasted labor of this sheet, where the best part is indubitably just that slighted corner. It is most disappointing, by the way, in all the one hundred and six numbers not to find so much as a hint of figure drawing, which Mr. Ruskin has practised much, I believe, and which he rightly extols as almost the beginning and the end of art.

In conclusion, I may say that if a good technical artist were to exhibit a series of his works, beginning with the very earliest, it would need no printed commentary to explain its value or enforce its lessons. But Mr. Ruskin is primarily a critic, and a teacher who uses and refers to his technical performance merely to sustain and illustrate his criticisms. So we turn first to his catalogue, for its own sake, and then to his drawings, as a gauge by which to try his words. And not from his drawings directly, but only by comparing them with his judgments upon them, can we test the probable value of his opinions in a wider field. M. G. VAN RENSSELAER.

THE "QUEEN ANNE" STYLE.

"F. A. W." raises a question which is by no means easy to answer, — What is the exact definition of the "Queen Anne" style? The term is so loosely used, and the real examples of the style have so little that is characteristic about them, that every builder and furniture dealer can rehabilitate his obsolete designs, or invent new and unheard-of ones out of his own head, and put them boldly forward as examples of the new style without much risk of being repudiated.

The safest way of investigating a style is to study the constructional requirements from which its motives are derived. In this aspect, the distinguishing characteristic of the English buildings — the best examples — erected in the early years of the last century was their extensive use of brick. There was no question of Gothic or classic form with their builders; some remains of the mediæval passion for picturesqueness may have unconsciously come down to them, but the design of detail was thoroughly and wholly classic, as they understood classicism, and had been so for a hundred and fifty years. They had no patterns or models whatever for balustrades, window dressings, or interior finish, which they did not believe to be derived from the Italian or French Renaissance, the crown of architectural fashion.

Nevertheless, the local use of cut stone, which had persisted, from its exclusive use in Go hic ages, through the "red brick and ashlar" compromise of the Elizabethan and Jacobean period, to that time, seems to have suddenly declined, and with this came a change in forms, necessitated by the change in material. Perhaps the decline of skill among the stone-cutters, which we know to have taken place then, was a cause as well as result of the movement; however that may be, red brick, moulded or plain, began to take as far as possible the place of stone. Flat or segmental arches superseded lintels, mullions disappeared, gable copings were ingeniously contrived out of bricks on edge, and moulded and carved brickwork supplanted stone for string-courses and panels. With this came a modification in the general character of design; the bold projections, corbels, and consoles of stone could not be imitated in the small material, and flatness and delicacy became the rule.

All this was rational, and consequently satisfactory to both taste and understanding, and so followed, not caricatured, no style is more suited to the requirements of our own time, or better adapted to serve as the ground-work on which the more catholic taste of our day might operate to develop new beauties of its own.

Contemporaneous with this brick architecture, but far less definitely bounded within a given period, existed in England a "half-timbered," or "wood and plaster," construction for rural buildings, not differing materially from that in use since the days of Elizabeth, except that details, where such luxuries appeared, were more frankly classic. These serve as models for the English architects of to-day.

In our own country appeared a modified style, more interesting than either of its parent fashions, as being an attempt to combine both in a structure different from either; to recall the picturesqueness of Devonshire and Kent, as well as the aristocratic elegance of the towers, in studding and clapboards. Little of this is now left; here and there an overhanging upper story, a prettily carved Corinthian capital, or delicate moulding in wood, or a picturesque turn to a roof, reveal the skill and taste of the colonial builders, as well as their poverty in material; but it would be well if such examples as we have were adopted for our similar constructions of the present day, instead of attempting to imitate at second hand in seven-eighths boards and shingles the brickwork and half-timber which Norman Shaw and the other English architects can study in original examples at every step, while they are as unfamiliar to us as our own clapboards and studding would be to them. How difficult it is to succeed in our second-hand imitation, Mr. Price's pretty design, referred to by "F. A. W.," shows. His problem evidently was, to construct a country house of wood in a hot climate. This requires verandas, but there being no authentic example of a real Queen Anne veranda, the designer invented one, using posts suggested by the so-called Jacobean furniture legs, and supplied with a Queen Anne flavor by introducing a mock fanlight, of the orthodox pattern, between the posts. A tower, for a look-out, being also demanded, and the proper examples of such being in England, out of reach if they exist at all, the architect has adopted a kind of French Colombier, spiced, like mock-turtle soup, with a real Queen Anne sun-dial on its wall to give it the proper smack. So with all the other details. It is no disparagement to the designer, but the reverse, to say that his talent has made a beautiful and harmonious whole out of necessarily various materials, in which the Queen Anne element holds a comparatively small place. If there were any other name for it no one would think of calling it by that one; but it is not Gothic, or Ionic, or Corinthian, or Romanesque, and yet it must be christened somehow; and so, on the principle of the French painter, who called his picture the Sacrifice of Isaac, though both Abraham and Isaac were explained to be out of sight around the corner, this and all the other nondescript structures of the period are endowed with the name for the moment fashionable. C.

THE "QUEEN ANNE" STYLE.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — The following quotation from a local daily paper may perhaps contribute a little to the fog in which "F. A. W." finds the "Queen Anne" style to be enshrouded, as well as to show what is retailed for Queen Anne in these parts.

"At the front a spacious square bay-window which will contain a sheet of plate glass 72 × 80 inches, surrounded by setting of stained glass, and stucco work in the Queen Anne style."

The report itself is doubtless correct. GRAPHITES.

NOTES AND CLIPPINGS.

THE WASHINGTON MONUMENT. — The committee on the District of Columbia has adopted a bill appropriating $677,000 for the completion of the unfinished shaft of the Washington Monument.

MR. RUSKIN ON THE RESTORATION OF ST. MARK'S. — Mr. Ruskin has just printed a pamphlet for private circulation, in which he explains his silence respecting the projected restoration of St. Mark's Church, in Venice. He says: "I am now entirely unable to take part in exciting business, or even, without grave danger, to allow my mind to dwell on the subjects which, having once been dearest to it, are now the sources of acutest pain. The illness which almost killed me nearly two years ago was not brought on by overwork, but by grief at the course of public affairs in England, and by affairs, public and private alike, in Venice; the distress of many an old and deeply regarded friend there among the humbler classes of the city being as necessary a consequence of the modern system of centralization as the destruction of her ancient civil and religious buildings."

A STATEMENT WITH A MORAL. — An architect has declared the Presbyterian church at Vinton, Iowa, unsafe, and it has been closed. The church was built two years ago at a cost of $35,000.

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A Find of Statuettes. — The Marchese Grillon, the husband of Mme. Ristori, is building a mansion in the new and yet unfinished part of the Via Nazionale, Rome, and recently, in digging the very last spadeful, almost, of the foundations, the workmen came upon a large deposit of ancient bronzes. The find was at once seen to be a very important one, and it has been pronounced by a very competent authority, on a first but by no means complete examination, to be worth at least 75,000 francs, and probably more. Some of the statuettes found are of Roman, and others of superior Greek workmanship.

Cannon for our Soldiers' Monuments. — So many applications have been made, by means of bills in Congress, for grants of condemned cannon, to be used in building soldiers' monuments, that the Secretary of War has been called upon to make a statement, showing how many such cannon have been given away, and how many there are left. There were none given until 1868. In 1870 there were given 195 bronze cannon, worth $22,638.60, with $1,275 worth of iron cannon; in 1871, 43 bronze cannon, worth $13,333.76, and $1,240 worth of iron; in 1872, 74 of bronze, worth $8,900, and $556 worth of iron; in 1873, 110 of bronze, worth $31,522; in 1874, 136 of bronze, worth $15,709; in 1875, 14 of bronze, worth $3,602. In 1876 only 4 bronze cannon were given, and in 1877 none; but in 1878 the number rose to 24, and in 1879 to 37. The total weight of the bronze cannon given for these purposes was 512,739 pounds, and of iron 357,084 pounds. The value of these cannon was $111,345. There are only 268 condemned bronze cannon left, and 230 of iron. The Lincoln monument needs more bronze cannon than can be furnished, and there are demands from the Gettysburg Battle-Field Memorial Association which ought to be satisfied. There are yet to be called for 120 guns given away by acts recently passed.

Protecting St. Paul's from Lightning. — Some six years have elapsed since a system of lightning conductors was applied to St. Paul's Cathedral by Mr. John Falkner, of Manchester. That the system has proved itself, so far, an efficient one, the number and severity of thunderstorms since then, and the absence of damage to the Cathedral, is sufficient testimony to the excellence of Mr. Falkner's method. His mode of proceeding in fitting the conductors he thus describes: "In the metallic connection, with cross, and ball, and scrolls, are eight copper conductors, each being a half-inch strand of copper wires. The octagonal strand has been adopted as giving most metal in the least space. These eight conductors pass to the metal railing of the golden gallery, with which they are in metallic connection. Thence they are carried down to the dome, to the metallic surface of which they are again connected at several portions of their length. Then down the rain-falls over the leaden roofs of the aisles, in the angles formed by the aisles themselves; again down the rain-falls to the sewers. Further, the choir and nave roofs are connected together by a saddle, or conductor, stretching over them both, and joined to the conductors proceeding from the summit of the west towers." The dome, aisle roofs, and ball and cross, and the two western towers thus form one immense metallic conductor. The copper strands are passed into the sewers for the sake of the moist earth connection, and are here rivetted to copper plates, which in turn are pegged into the earth. Mr. Falkner's system of practical testing he carries out as follows: At any point to be tested a wire is carried to a neighboring gas-pipe for a second earth; this wire is attached to an ordinary vertical galvanometer, and this again to a couple of Leclanché cells, the other pole of the two-celled battery carrying a wire which is touched to the portion of metal roofing to be tested. The galvanometer is first deflected with only the wire in circuit, and the deflection is noted. Then the earth-connections are made, and the deflection is again noted. Unless the deflections are identical within a limit of one or two degrees, Mr. Falkner proceeds to re-connect by bands that portion under test to some other portion giving perfect earth. In this way nearly every square yard of the leads has been tested. Only very recently this test has been applied with satisfactory results. The subject of lightning conductors is one that is exercising architects very considerably just at present. It may be hoped that the outcome of the present discussions and volumes of written opinions will produce some practical results. — *The British Architect.*

The London Opera-House. — We are in doubt whether the following item, which we clip from a daily paper, refers to some new movement for recommencing work on the abandoned opera-house on the Thames Embankment, to which we have often referred, or whether it explains the method by which money for the original undertaking was raised. The item reads as follows: —

"A grand National Opera-House is to be built on the Thames Embankment in London, and it is expected will be a model theatre. The cost will be $750,000. The plan on which it is to be built is rather a strange one. Each shareholder on taking a share receives 5 per cent interest, and in addition is allowed to nominate the life of anybody he chooses. The annual income of the opera-house is divided ratably among the shareholders, and, as each of the so appointed lives or nominees deceases, those shareholders only whose nominees survive continue to divide ratably the annual income, until eventually the shareholder whose nominee survives all the others becomes entitled to all the property: but, until this occurs every year brings him in from 20 or 30 to 50 per cent, as the case may be. Each shareholder has a right to name a life in respect to each of his shares, and in order to expedite matters so that the tontine may be determined within a respectable time, no one is to be nominated that is under 60 years, and when the next ten, twelve, or fifteen years have passed away the lucky winner will be left to enjoy his property."

The Dusseldorf Exhibition. — The building in which the exhibition of next year is to be held at Dusseldorf is now, so far as the walls and roofing are concerned, complete. The length of the main building is 1,181 feet, and the area it covers is almost exactly equal to that of the Exhibition Palace at Sydney, New South Wales, or about half the length of the great Exhibition Building at Paris in 1878. The total number of exhibitors in the industrial portion, reckoning the numerous collective exhibitions as only one, will amount to upwards of 3,000, and every branch of German industry, manufactures, and commerce will be represented at the show.

Dampness in Summer Houses. — *Le Technologiste* suggests that the dampness that is sure to accumulate in houses in the country or by the seaside, that are shut up and uninhabited during the winter, may be prevented by placing in one of the rooms a large bowl of chloride of lime, which is to be set in a larger bowl, so that the dampness which is absorbed from the atmosphere by the lime may overflow into it, and not on to the floor. Of course it will be necessary to leave all inside doors open, and likewise it will be necessary to close all outside doors and windows, as hermetically as possible, else the bowl of lime will be set to perform a task that even the Danaidæ would shrink from. The cost and trouble of making the house practically air-tight on leaving it for the winter would, however, be counterbalanced by the saving effected by keeping books and papers free from mould, the furniture from swelling and warping, and the assurance of better health to the occupants.

A Prehistoric Rock Painting. — Not a hundred miles below Nashville is a curious spectacle, known as "Sun and Moon." It consists of a painting upon an immense rock which rises to an altitude of several hundred feet. As to who painted it is a mystery which I believe was never unravelled. Many think it was the work of the red brother, centuries ago, perhaps. But there the sun and the moon shine out in all the freshness of new paint. They are midway on the cliff, and stand out in bold relief. How any human being ever reached the spot is a question which I believe has never been solved. It is supposed that in those days they had no giant ladders, and could not easily have reached the point from below. The only natural rope of that time was a wild grapevine, of which Tennessee is so prolific, and some Indian might have been, by this means, let down over the dizzy bluff, and, when he had finished his work, again been let down or pulled up. At any rate, these pictures are there on the everlasting rock, and are likely to remain for future ages — *Cincinnati Commercial.*

A New Sewage System for Liverpool. — The latest attempt to solve the sewage problem has just been made, by the construction, on the Clyde, Scotland, of a sewage steamer called the Alpha. It was designed and built by Messrs. Simon & Coy, of Renfrew, to the order of the Corporation of Liverpool, for the purpose of conveying the sewage of that city far out to sea. In its construction, the well is wider at the bottom than at the top, and, instead of being one oblong tank, it is divided into ten compartments. These are separated by perpendicular partitions, so that the contents may fall readily into the water. The doors are worked on a novel principle. Along the centre is a set of gearing, by which the doors are opened and shut; they are kept open by strong iron bars until the load has fallen. A patent pulsometer pump, of large dimensions, is fitted in the stoke hole, with a discharge pipe on deck, designed to force out any light substance which may have clung to the sides. Externally, the vessel resembles an ordinary steamer. The hull and deck are built of iron, but the hopper cavities are of steel. It is expected to carry a dead weight of three hundred and fifty tons, at a speed of nine knots an hour. It will immediately be used to transport the refuse from the streets, but if the experiment prove successful, the system will be applied to liquid and solid sewage, and vessels with a capacity of one thousand tons may be built. — *Engineering News.*

London Fires in 1879. — Captain Eyre Massy Shaw, C. B., Chief Officer of the London Fire Brigade, has made his report on the state of his command, and the fires in London in 1879. The number of calls for fires or supposed fires received during the year was 1,949. Of these, 116 were false alarms, 115 proved to be only chimney alarms, and 1,718 were calls for fires, of which 159 resulted in serious damage and 1,559 in slight damage. The fires of 1879, compared with those of 1878, show an increase of 59; and, compared with the average of the last ten years, there is an increase of 85. The proportion of serious to slight losses, 159 to 1,559, is most favorable; and, notwithstanding several exceptional periods, as for instance, the year 1872, Captain Shaw thinks he is justified in saying that the value of property destroyed in London was less in 1879 than in any other year since the formation of the fire brigade. The number of fires in the metropolis in which life was seriously endangered during the year 1879 was 96; and the number of those in which life was lost was 27. The number of persons seriously endangered by fire was 164, of whom 132 were saved and 32 lost their lives. Of the 32 lost, 15 were taken out alive, but died afterwards in hospitals or elsewhere, and 17 were suffocated or burned to death. The number of calls for chimneys was 4,169. Of these 1,375 proved to be false alarms, and 2,794 were for chimneys on fire. In these cases there was no attendance of engines, but only of firemen with hand-pumps. The number of journeys made by the fire-engines of the 52 land stations was 22,184, and the total distance run was 50,491 miles. The quantity of water used for extinguishing fires in the metropolis during the year was, in round numbers, a little more than 16,000,000 gallons, or about 72,000 tons. Of this quantity about 32 000 tons, or a little more than two fifths of the whole, were taken from the river, canals, and docks; and the remainder from the street pipes. During the year there were 9 cases of short supply of water, 33 of late attendance of turncocks, and 18 of no attendance, making altogether 60 cases in which the water arrangements were unsatisfactory. The strength of the brigade at present is as follows: 52 land fire-engine stations, 1 movable land station, 113 fire-escape stations, 4 floating stations, 3 large land steam fire-engines, 34 small land steam fire-engines, 12 seven-inch manual fire-engines, 37 under six-inch manual fire-engines, 130 fire-escapes and long scaling ladders, 3 floating steam fire-engines, 1 steam-tug, 17 hose-carts, 15 vans, 3 barges, 57 telegraph lines, 106 miles of telegraph lines, 452 firemen, including chief officers, superintendents, and all ranks. The number of firemen employed on the several watches kept up throughout the metropolis is at present 104 by day and 188 by night, making a total of 292 in every twenty-four hours; the remaining men are available for general work at fires. The list of wounded and other injuries for 1879 is unfortunately very large, but this will always be the case as long as the men work with zeal and energy. There were during the year 297 cases of ordinary illness and 69 injuries, making a total of 366 cases, of which many were very serious. The condition of the brigade with regard to discipline and general efficiency is, in all respects, perfectly satisfactory.

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BUILDING INTELLIGENCE.

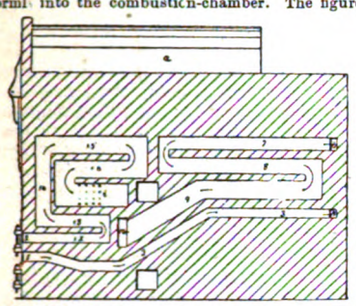
[Reported for the American Architect and Building News.]

[Although a large portion of the building intelligence is provided by their regular correspondents, the editor greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

222,631. SMOKE AND GAS CONSUMING FURNACE. — Kingsbury M. Jarvis, Malden, Mass. This invention relates to furnaces for steam-boilers and other similar purposes, and is intended as an improvement on the furnace for which Letters Patent Nos. 176,639, 186,734, and 189,862 were granted. The present invention consists of a novel construction of the chamber behind and in the bridge-wall, such construction permitting the heated air to deliver more uniformly into the combustion-chamber. The figure represents a sectional view of the side wall. The boiler *a*, fire-chamber, grate *b*, ash-pit, and combustion-chamber are all as described in aforesaid patents. The front and rear ducts both begin at the front of the furnace at 1 and 2. The rear duct starts at 1, and, passing along the side of the combustion-chamber, as shown at 3, and by the passage 4 to the open space 5 in the rear wall of the furnace, returns thence to the side wall, and winds back and forth therein, as shown at 6, 7, 8, 9, and finally enters through passage 10 into the portion *c* of the chamber behind the bridge-wall. The portion *c* of the chamber passes across through the bridge-wall, and is connected with the main portion *d* of the chamber by a series of vertical slots in the partition *f*, separating the portions *c*, *d* of the chamber. The heated air from the rear ducts, having been received in the portion *d* of the chamber, passes up through a perforated plate, where it mixes with the gases set free from the fuel in the fire-chamber, and causes complete combustion. The front ducts, receiving air at 2 at the front of the furnace, pass, as shown at 12, 13, 14, 15, 16, back and forth in the side wall at the side of the fire-chamber, and finally deliver the air, heated in its passage, through another perforated plate into the furnace near, but above, the bridge-wall. The ducts increase in sectional area from the point at which the air is received to that where it is delivered, to allow the air to expand freely as it becomes heated. Nearly the whole heating portion of the furnace-walls is traversed by the air to be heated.



224,268. COMBINED BURGLAR-ALARM AND DOOR-BELL. — John Berkey and William F. Keller, Easton, Penn.

224,287. CURTAIN-FIXTURE. — Willard H. Gilman, Beebe Plain, Quebec, Canada, and Frederick A. Wiswall, Derby, Vt.

224,288. LOCK. — Friedrich Hasdenteufel, Iserlohn, Prussia, Germany.

224,295 WATERPROOFING COMPOUND. — Daniel M. Lamb, New York, N. Y.

224,300. COAL AND ROCK DRILL. — Bernhard Leonard, Mahanoy City, Penn.

224,309. HYDRAULIC EXCAVATING. — Roy Stone, New York, N. Y.

224,324. FASTENER FOR MEETING-RAILS OF SASHES. — William Brinton, Polbathic, St. Germans, England.

224,331. PUMP. — James F. Gelletly, Baltimore, Md.

224,333. SHINGLE-CUTTING MACHINE. — P. H. Griswold, Tonawanda, N. Y.

224,348. KNOB ATTACHMENT.— Emery Parker, New Britain, Conn.

224,352. KILN FOR BURNING BRICK, POTTERY, ETC. — Francis Raffinetti, Genoa, Italy, and James Austin and Emanuel Gandolfo, New York, N. Y.

224,354. FAUCET. — Charles C. Redmond and Archibald W. White, San José, Cal.

224,363. SASH-HOLDER.— Samuel I. Sutton, Dublin, Va.

224,367. COMPOUND FOR DISINFECTION. — William Wheeler, Philadelphia, Penn.

224,373. LOCK. — Carl W. Ade, Stuttgart, Germany.

224,374. EXTENSION-LADDER. — Stephen B. Adams, Dunreith, Ind.

224,377. DOOR-SPRING. — Joseph H. Barker, Cincinnati, Ohio.

224,380. LOCK. — John Betjemann, Pentonville Road, England.

224,388. PAPER VENEER. — Isaiah M. Clark, Coldwater, Mich.

224,401. TEN-FOOT EXTENSION RULE. — Wm. J. Derickson, Clayton, Cal.

224,416. ELEVATOR.— Dennis Frisbie, New Haven, Conn.

224,431. FIRE-EXTINGUISHER. — John Hill, Columbus, Ga.

224,466. WINDOW CORNICE.— Martin Murphy, Brooklyn, N. Y.

224,473. MACHINE FOR POLISHING WOOD. — George Pelstring, Cincinnati, O.

224,480. MACHINE FOR SMOOTHING WOOD, ETC.—Wilhelm Sassack, New York, N. Y.

224,488. HOT-AIR FURNACE. — Oscar C. Stafford, Minneapolis, Minn.

224 504. INSULATED CRESTING. — Josephus C. Chambers, Cincinnati, O.

9,068. DISINFECTING APPARATUS FOR WATER-CLOSET. — (*Reissue.*) Edward J. Mallett, Jr., New York, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since our last report: —

Mrs. M. C. Robinson, three-st'y brick dwell., on Charles St., near Eager.

Mrs. F. Stewart, three-st'y brick dwell., No. 17 Warner St.

Mrs. Albert Bayler, two-st'y brick dwell., 325 Gay St., bet. Forest and Aisquith St.

Bernard Link, two-st'y brick building on Lombard St., near Washington St.

HOUSE. — Mr. John Hetzel is building a fine house on Eutaw Place, 22 feet 6 inches front and 70 feet deep, of pressed brick, with marble finish, and hard wood inside, to cost $10,000. Mr. Wm. F. Weber is the architect and superintendent. It is not done under contract.

QUARANTINE STATION. — The president and vice-president of the National Board of Health, and Dr. C. B. Goldsborough, of the United States Marine Hospital Service, have held a consultation with the state and city health officials relative to the quarantine regulations for the Port of Baltimore. It was decided that the removal of the quarantine station was needed, and that the proper place for a new station was on the city's property at Hawkin Point.

COURT-HOUSE. — In 1876 an ordinance was before the Council to appropriate $800,000 to purchase and build a court-house on the lot of ground bounded by St. Paul, Calvert, Fayette, and Lexington Streets, but it was defeated on account of the amount required. There is now being prepared a resolution to direct the city solicitor to make an estimate of the amount required to purchase that lot, with the idea of building a court-house upon it.

Boston.

BUILDING PERMITS. — Since our last report the building permits granted are as follows: —

Brick. — 39 *Beverley St.*, 1 carriage-house, 40′ x 75′; three stories; Jas. White, owner; Otis Wentworth, builder.

Wood. — *E. First St.*, for Warren Chemical Co., 1 storehouse, 40′ x 40′; W. T. Eaton, builder.

L St., for City of Boston, 1 bathing-house, 25′ x 60′; J. Stevens, builder.

Mather St, Ward 24, for B. F. Stetson, 1 dwell, 20′ x 30′; T. M. Stetson, builder.

Murray Ave., Ward 21, 2 dwells, 29′ x 40′; Wm. Donaldson, owner and builder.

WAREHOUSE. — H. W. Wellington will build a first-class warehouse at the corner of Bedford and Chauncy Streets, for the occupation of Wellington Brothers. The building will be 63 feet by 90 feet; six stories in height above the basement. The materials of the façades are not fully determined, but will be either entirely of granite or mostly brick; Mr. S. J. F. Thayer, architect.

Brooklyn.

BUILDING PERMITS. — *Huntington St.*, 1 one-st'y frame factory, 80′ x 30′; owner, John E. Borne & Co.; builders, Thos. W. Jones.

Van Dyke St., 1 two-st'y frame dwell., 22′ x 32′; owner, Michael Cahill, 70 Van Dyke St; mason, Mr. Mahoney; carpenters, M. & J. Shelly.

Washington Ave., No. 442, 1 four-st'y brown-stone dwell., 18′ x 45′; owner, Thomas Read, 440 Washington Ave.; carpenter, H. J. Smith; mason, John Rentum.

Commercial St., Nos. 68 *and* 70, 1 three-st'y brick blacksmith shop, 50′ x 80′; owner, E. G. Stache, 109 Dupont St.; architect, Fred. Weber; mason, G. J. Roberts; carpenter, —— Eggers.

North Sixth St., No. 258, 1 two-st'y frame tenement, 24′ x 48′; owner, Michael Schmith, on premises; builder, John Rueger.

North Seventh St., cor. Fourth St., 2 four-st'y brick tenements, 20′ x 50′; owner, John Clark, on premises; architect, Thos. F. Houghton.

Monroe St., 2 two-st'y brick dwells., 12′ 6″ x 45′; cost, each, $2 200; owner and carpenter, Charles Isbill; mason, William Uris.

Hopkins St., 1 two-st'y frame dwell., 17′ x 40′; cost, $1,500; owner, George Schank; builder, Nicholas Grass.

Patchen Ave., 1 two-st'y brick dwell., 20′ x 32′; owner, Philip Sullivan, 409 Decatur St.; architect, T. F. Houghton.

ALTERATIONS.— *Debevoise St., No.* 4, three-st'y frame extension, 22′ x 25; cost, $2,3 0; owner, Jno. Wolff, on premises; architect, F. H. Engelhart; builder, N. Grass.

Cambridge Place, raised one st'y, mansard roof; cost, $2,000; owner, S. L. Woodford, cor Gates and Washington Aves.; carpenter, D. H. Fowler; mason, Phil. Sullivan.

Burlington, Io.

CHURCH. — The Jesuit Brothers are about to commence, in a few weeks, a church building, 80 by 125 feet.

FACTORY. — Funk & Hertzler are to build a wagon shop 50 by 117 feet, two stories and basement; brick and stone.

GRAIN ELEVATOR. — Mr. Harrison has obtained permission from the city council for another elevator 120 by 120 feet, to be built on the levee close to the river.

Milwaukee.

BUILDING. — Some evidence of preparation for building in the spring is beginning to manifest itself in the architects' offices.

FACTORY. — E. T. Mix, architect, has already let one contract, — a building for a chair factory; 40 by 120 feet, three stories; cost, $11,200.

He is also preparing plans for several dwellings, the contracts for which will be let early.

THEATRE. — H. C. Koch & Co., architects, have this winter prepared plans for a large amusement hall or theatre and some other buildings, to be built in Quentin's Park, a place devoted to summer amusements and owned by the Schlitz Brewing Company. The cost of the buildings will be upwards of $50,000. Work has already commenced on these buildings.

This firm is also preparing plans for several dwellings, all of which will be put under contract early in the spring.

New York.

BUILDING PERMITS. — *Lexington Ave.*, cor. 121st St., 6 three-st'y brick (brown-stone front) dwells., one 17′ 7″ x 45′, and 16′ 8″ x 45′; cost $10,000 each; owner, Miss Frederica R. Neihbur, 226 East 109th St.; architect, Wm. F. Neihbur; builders, H. P. & Wm. F. Niehbur.

One Hundred and Twenty-first St., 4 three-st'y brick (brown-stone front) dwells., each 16′ 8″ x 45′; cost, $8,000 each; owner, Miss Frederica R. Neihbur, 226 East 109th St.; architect, Wm. F. Neihbur; builders, H. P. & Wm. Neihbur.

Seventy-first St., 3 five-st'y brick apartment-houses, each 33′ 3½″ x 76′; cost, $11,500 each; owners, Improved Dwelling Association; architect, Geo. W. DaCunha.

Seventy-second St., 3 five-st'y brick apartment-houses, 33′ 3½″ x 76′; cost, $11,500 each; owners, Improved Dwelling Association; architect, Geo. W. DaCunha.

Fifth Ave., 1 four-st'y brick (brown-stone front) dwell., 24′ 11¾″ x 60′; cost, $31,000; owner, H. G. Silleck; architect, John G. Prague.

Fifty-fourth St., Nos. 137 *and* 139, *W.*, 2 two-st'y brick stables, 25′ x 90′; cost, each, $6,000; owner, E. Donnell, 44 W. Fifty eighth St.; mason, L. N. Crow; carpenters, McGuire & Sloane.

Fifty-fourth St., Nos. 143 *and* 145, 2 two-st'y brick stables, 25′ x 90′, gravel roofs and iron cornices; cost, each, $6,000; owner and builders, same as last.

Fifth Ave., 1 four-st'y brick store and tenement, 27′ x 57′; cost, $10.000; owner and builder, James Riley, cor. First Ave. and One Hundred and Fifteenth St.; architect, John B. McIntyre.

First Ave., 11 four-st'y brick apartment-houses; each 20′ x 52′; cost, each, $9,000; owners, Duffy Bros., 1830 Third Ave.; architect, Andrew Spence.

First Ave., cor. One Hundred and Thirteenth and cor. One Hundred and Fourteenth Sts., 2 four st y brick apartment-houses, with stores on first floors; each, 19′ 11″ x 66′ 6″; cost, each, $11,000; owners, Duffy Brothers; architect, Andrew Spence.

One Hundred and Fifteenth St., No. 420 *E.*, 1 four-st'y brick tenement, 25′ x 50′; cost, $6,(00; owner, John Taylor, 199 West Eleventh St.; carpenter, Wm. Kusche; mason, James O'Meara.

Seventeenth St., Nos 33, 35, *and* 37 *E.* (Union Sq.), 1 six-st'y brick store, 71′ 6½″ front, 120′ 7½″ rear, and 184′ deep; cost, $200,000; owners, Richard Arnold and Henrietta Constable; architect, Wm. Schickel.

Avenue A, cor Seventieth St., 1 three-st'y brick build., for planing mill and carpenter's shop, 52′ x 70′; cost, $12,000; owner, Ira E. Doying, 111 Fourth Ave.; architect, James E. Ware.

Fourth Ave., 1 two-st'y brick office, 20′ x 45′; cost, $1,890; owners, McCafferty & Buckley, 163 East Fifty-fourth St.; builder, R. W. Buckley.

First Ave., cor. Eighty-fifth St.. 1 four-st'y brick (brown-stone front) apartmen'-house, with store, 26′ 8″ x 60′ 1″; cost, $15,0 0; owner, O. W. Loeffler, 113 East Seventy-seventh St.; architect, John C. Burne; builder, J. A. Frame.

First Ave., 3 four-st'y brick (brown-stone front) apartment-houses, with stores; each, 25′ x 60′; cost. $14,000; owner, O. W. Loeffler, 113 E. Seventy seventh St.; architect, John C. Burne: builder, J. A. Frame.

Fifty-eighth St. No. 209 *W.*, 1 three-st'y brick stable and dwell., 25′ x 85′; cost, $10,000; owner and builder, W. N. Griswold, 744 Broadway.

Ninth Ave., cor. Forty-fifth St., 2 five-st'y brick tenements, with stores, 22′ 5″ x 54′ and 28′ x 54′; cost, $8,000 and $10,000; owner, John H. Barklage, 647 Ninth Ave.; architect, John M. Foster.

Seventy-first St., 1 three-st'y brick (brown-stone front) dwell., 20′ x 50′; cost, $11,000; owner and builder, John Davidson, 128 East Fifty-second St.; architect, Jas. E. Ware

ALTERATIONS.—*Broadway, No.* 828, three-st'y store and two-st'y factory to be raised to four stories; interior alterations; cost, $4,000; owner, Dr. Isaac E. Taylor, No. 1 East Thirty-sixth St.; architect, John B. Snook.

Fourth Ave., Nos. 381 *and* 383, 2 four-st'y brick buildings to be made into one apartment-house; cost, $5,000; owner, estate of Wm. Simpson, 5 East Fourteenth St.; architect, John B. Snook; builder, B Blackledge.

Fulton St., No. 83, three-st'y store, new front in first story; cost, $2,0 0; owner, C. J. Pryer, 52 West Twenty-seventh St.; mason, J. Allen; carpenter, J. Miller.

Eighth Ave., No. 446, four-st'y brick tenement, with restaurant, a one-st'y extension to rear, 19′ 6″ x 56′ 3″; cost, $2,000; lessee, Justus C. Wolff, on premises; architect, Wm. Kuhles.

Nineteenth St., Nos. 154 *and* 156 *W.*, five-st'y brick factory building, repair damages by fire; cost, $4,789; owner, G. C. Flint, 104 West Fourteenth St.; architect and builder, Henry Wallace.

No. 199 Chambers St is to be extended and improved, under the superintendence of Messrs. O. P. & R. F. Hatfield. Bids are now being received for the work.

BANK BUILDING. — The building on the corner of Broadway and Wall St. is to be torn down and a fine edifice is to be built on the site by the Bank of the Republic, which will remove into the Drexel Building during the rebuilding.

BUILDING MATERIALS — Brick is not quite so stiffly held this week, but the price of other building materials is very firm, and will probably be maintained. There has been a decided advance in the price of southern lumber.

CHURCH. — Old Trinity Church, in Harlem, recently burned, is to be rebuilt.

FACTORY. — At a cost of $25,000, a six st'y factory, 50′ x 65′, Nos. 386 and 386½ Mulberry St, is to be built, of brick and granite. Mr. Rd. Deeves is the builder, and Mr. Wm. Graul the architect.

HOUSES.— On Seventy-fifth St., between Fourth and Madison Aves., six first-class residences are to be built at a cost of about $18,000 each. The fronts will be brown-stone and the interior finish of hard wood. Messrs. Thom & Wilson are the architects.

STOCK EXCHANGE — The negotiations which have been on foot for several months past to secure ground for the extension of the New York Stock Exchange have at length been concluded. The purchase has been made of three lots on Mew St., Nos. 12, 14, and 16, adjoining the rear of the Exchange, and No. 14 Broad St., for $375,000. The plans for the new building have not yet been fully decided on, but will probably be considered immediately.

STORE. — On the south side of Forty-seventh St., 59 feet west of Broadway, a first-class five-st'y brick store is to be built for Mr. Chas. Johnson from designs of Messrs. D. & J. Jardine. Messrs. N. & H. Andrews are the builders. The building is to be 34 feet in front, with a depth of 92 feet.

Oakland, Cal.

HALL OF RECORDS. — The new Hall of Records, County Clerk's office, which was won in open competition by Wm. Stokes, last summer, is fast growing toward comple-

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tion. The building is 125 by 100 feet and two stories in height. The walls are brick. The fronts are faced with pressed brick, with cement and iron finish; cost, $80,000.

Masonic Temple. — The Masons are building a new temple on the corner of Washington Street and Central Avenue. It will be three stories high, the first devoted to stores, and the second and third to the uses of the lodges. The exterior walls will be faced with pressed brick and have sandstone finish.

Philadelphia.

Building Permits. — Front and side alteration, S. E. cor. Eighth and Chestnut Sts.; Jas. B. Doyle, contractor, 915 Filbert St.

Front alteration, 1821 Arch St.; Geo. Kessler, contractor, 1822 Marshall St.

Front and side alteration, S. E. cor. Fifteenth and Filbert Sts.; David Bergin, Master St. and Lancaster Ave.

Two-st'y dwell., 14′ x 80′, Rover and Cambria Sts.; John Cunningham, contractor, 2733 Waterloo St.

156 N. Third St., two-st'y brick block, 14′ x 15′; Chas. Ricker, 156 N. Third St.

One st'y store, cor. Hanover and Girard Ave.; T. C. Matlock, 106 Putnam St.

3 two-st'y dwells., 11′ 8″ x 44′, Twenty-seventh and Oxford Sts.; W. H. Pole, 2721 Oxford St.

One-st'y added to factory, Hancock and Putnam Sts., 15′ x 120′; Jas. McCartney, 642 Franklin St.

Three-st'y store and hall, 19′ 8″ x 71′, cor. Twenty-third and South Sts.; Michael Gibbon, cor. Christian St. and Gray's Ferry.

One two-st'y house, Third and Oxford Sts., 20′ x 70′; Patrick McCormick, 1415 American St.

New front to store 48 N. Delaware Ave.; John Wilson, 2507 Story St.

Alteration S. W. cor. Eighth and Market Sts.; W. P. Fogg, 114 N. Thirteenth St.

Seventh story add. to factory, 30′ x 90′, cor. Third and Canal Sts.; Benj. Ketcham & Son, 1029 Brown St.

Alteration. — The building of the old Reform Club, on Chestnut Street, above Fifteenth, has recently been bought by Alfred G. Baker, President of the Franklin Insurance Company, who proposes to change it into large stores.

Brewery. — On Broad St., above Columbia Ave., the ground is being excavated for a brewery for Philegh J. Lauber. This building, 70′ x 75′, will be five stories in height, fireproof, and built of ornamental brick; cost, $50,000; Murrill Dobbins, builder; Mr H. J. Schwartzman, architect, of New York.

Office Building. — Mr. T. P. Chandler, Jr., has been appointed architect of the building for the Union Insurance Company to be built at the corner of Third and Walnut Streets. Detail drawings and specifications are now being made, prior to receiving the bids for its construction.

Hotel. — No. 1914 Chestnut (Tue Aldine Hotel), J. B. Lippincott & Co., owners, is to have an addition 30 by 200 feet; contract not yet awarded; Addison Hutton, architect.

Houses. — Corner of Thirty-eighth and Ludlow Streets, nine three-story dwellings, 25 by 45 feet; owner, E. A. Rollins; contractor, W. S. Kimball; architect, G. W. Hewitt; cost, $42,000; brick.

No. 524 Market Street, rear addition; two stories, 60 by 24 feet; owners Barrett, Gunnis & Hogan; Josef Q. Lancuica, superintendent; cost, $3,500; brick.

At Camac Place, running from Diamond St. to Susquehanna Ave. on Thirteenth St., John Baird is having built thirty-four model dwellings, of brick and marble. On Thirteenth St., above Norris, D. C. Clever is building six houses, three stories in height, 18′ 6″ x 78′; cost, about $75,000.

Insurance Building. — The Insurance Company of North America is about to build a fine fire-proof building on the property Nos. 228, 230, and 232 Walnut Street; architect not yet chosen.

Stores. — Thirty-eighth and Market Streets, 8 stores; one story, 25 by 50 feet; owner, E. A. Rollins; contractor, P. Muller; architect, G. W. Hewitt; cost, $10,400; brick.

At the cor. of Thirteenth and Chestnut Sts., old buildings are being torn down to make way for a large store for Mr. Geo. Howell. This building, 37′ x 104′, will be four stories in height, built of brick, and Montgomery marble; cost, $30,000. Marriner & Buckingham, builders; Mr. S. D. Button, architect.

St. Louis.

Building Permits. — Forty permits have been issued since our last report, of which eleven are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows: —

Owners.	Use.	Stories.	Rooms.	Cost.
J. Rener.	Dwelling.	2	12	$3,500
G. B. Allan.	Iron Warehouse.	3	3	15,000
Mrs. E. Garth.	Dwelling.	2	14	7,000
J. Maher.	Dwelling.	3	14	10,000

General Notes.

Adams, Mass. — The Episcopalians have raised the $2,500 necessary to secure L. L. Brown's gift of $1,200 to build a new church, but more money is needed for contingencies. The church will be built the coming summer.

Atlantic, Io. — A leading citizen offers to give $5,000 towards building a $15,000 court-house here.

Atlantic City, N. J.—J.C. Sidney & Son, Philadelphia, have drawn plans for a house for Chas. Sparks; cost, $8,500. The contract for the building of the four houses for A. H. Craig has been awarded to Donsley & Thomas. Cost, $12,000. Wilson Bros. & Co architects.

Bluffton, Ind. — Mr. I. Hodgson, architect, of Indianapolis, is building the new jail, which will cost $25,000, and the theatre, which will cost $18,000.

Bristol, Vt. — Col. N. F. Dunshee, high sheriff of Addison county, will build a new block of stores on the "Holly Corner" the coming spring.

Cambridge, Mass. — An addition to the Museum of Comparative Zoölogy is to be built from the drawings of Mr. G. R. Shaw, architect, of Boston. It will measure 80′ x 80′; Rumery & Maxwell, builders.

Cambridge City, Ind. — Messrs. Huebner & Mueller, of Indianapolis, are the architects of the Catholic church now building here at a cost of $8,000.

Cape May, N. J. — J. C. Sidney & Son, Philadelphia, have drawn plans for Jas. Myer's house, 42′ x 65′; cost $6,000.

Concord, N. H. — Two wooden houses for Mrs. A. J. Howe and the Hon. J. Hosmer are building, to cost respectively about $5,000 and $3,000; W. H. Benjamin, builder.

A house with wooden sides and brick ends is building for Mr. Frank B. Sanborn. Mr. H. W. Hartwell, of Boston, is architect of all three.

Delavan, Wis. — Mr. E. T. Mix, architect, of Milwaukee, has prepared sketches for rebuilding the Deaf and Dumb Asylum, which was burned in the early part of the winter, which have been accepted.

Detroit, Mich. — Perrin Brothers, brick store and dwelling, No. 389 Michigan Avenue, $2,800.

D. A. Davis, eight frame dwellings on Twenty-first Street, $4,000.

George Teagan, two frame dwellings, cor. Trumbull Avenue and Locust Street, $1,400.

The corner-stone of the new fire-engine house building at the head of Griswold Street, on Clifford Street, was laid February 9.

Fairfield, Io. — Mr. S. Light is to build a two-story store and office building, 34 by 132 feet, of brick and stone, from designs prepared by Mr. C. A. Dunham, of Burlington, Io.

Flint, Mich. — An addition, 44 by 60 feet, and three stories high, will be built in front of the present woollen mills.

Fordham, N. Y. — Mr. Jas. Stroud, of New York, is the architect of the stable and training circus now building He has also drawn plans for a handsome dwelling on the Heights. It will be in the Queen Anne style, hard-wood finish, stained-glass windows, and will cost about $16,000.

Germantown, Pa — A three-st'y house, 35′ x 45′, will be built for John Colwell; cost $5,000. J. C. Sidney & Son, architects, Philadelphia.

Glencoe, Minn. — The Lutherans will build a new church this year.

Hamilton, O. — The Infirmary Commissioners have unanimously recommended that the County Commissioners proceed to build a new Infirmary building, at a cost not to exceed $50,000.

Harlan, Io. — Mr. C. A. Dunham, architect, of Burlington, Io., has just finished the drawing for the new jail for Shelby County, which will cost about $10,000.

Indianapolis, Ind. — At the end of the next building season the State House will be built up to the second story, at a cost of $500,000. The contractors have already paid out $50,000 more than they have received.

Ipswich, Mass. — An iron light-house is to be placed on Ipswich beach to replace the old one.

Ironton, O. — G. W. Thompson, architect, has drawn plans for two new houses on Sixth Street. One for Mr. C. C. Clark, and the other for Capt. Wm. Bay. About forty-five tenements are to be built by the New York & Ohio Iron and Steel Company upon their lands, out near the line of the Iron Railroad.

Kansas City, Mo. — Mr. T. C. Bermingham, agent of the J. W. Butler Paper Company, has purchased a lot on Delaware Street, 60 feet front by 120 deep, and will build a large four-story building.

Madison, Ind. — Mr. Wm. Trow, Jr., is building a mammoth warehouse on the site of the burned foundry on the river front.

Mendota, Ill. — A new jail is to be built here.

Moscow, Ky. — Mr. John Idlet is building a large tobacco warehouse at Point Pleasant

Norwich, Conn. — The town offers the State a farm worth $10,000 as a site for a new insane asylum.

Onancock, Va. — Mr. Wm. F. Weber, of Baltimore, has just completed the drawings for a new almshouse for Accomac County, to be built here, to be 62 by 70 feet, and 3 stories high. Contract has not yet been awarded.

Petoskey, Mich. — The German Methodists will build a church this fall.

Providence, R. I. — Ex-Mayor Knowles is building a new house on Pawtucket Avenue, at a cost of about $10,000.

The Providence & Springfield Railroad Company is building a passenger station on Cove Street, and it will be ready for occupancy about the 1st of June. It is two stories in height, 57 by 25 feet.

Salem, Mass. — Chase, Merritt & Richardson are rebuilding their factory. The main building will be brick, three stories, and 120 by 30 feet; cost, $20,000.

Sandwich, Mass. — The trustees of the Sandwich Academy have bought the Mrs. Wells place on Franklin Street, and a new academy building will be put up before next fall.

Shelbyville, Ill. — The new court-house is to cost $70,000.

Shelbyville, Ind. — St. Vincent's Catholic Church, four miles from this town, is building from the design of Mr. D. A. Bohlen, architect, of Indianapolis; cost, $10,000.

Stoneham, Mass. — The Congregational society has raised nearly enough money by subscription to warrant the commencement of their new chapel. It will be about 35 by 60 feet.

Taunton, Mass. — Messrs. Howard & Son, of Oakland, are about to add a weaving shop, picker-room, etc., to their mills. The dimensions of the former are to be 132 by 72 feet; the latter, a separate building, 40 by 40 feet; also a boiler-house, 42 by 28 feet; all to be built of brick.

Waltham, Mass. — Additions to the buildings of the American Watch Company are soon to be made. They will measure in the aggregate about 27 by 350 feet, will be three and four stories high, and will cost about $35,000. H. W. Hartwell, of Boston, architect.

Wellesley, Mass. — Mr. G. R. Shaw, of Boston, is the architect of a library to be given to the town of Wellesley by Mr. H. H. Hunnewell. The building will be of rubble, relieved with sandstone, and will cost about $25,000.

Winchester, Ky. — The new Clark County National Bank building will cost from $10,000 to $12,000.

Bids and Contracts.

Baltimore, Md. — The contract for building a hotel at Tolley's Point Sumner Resort, near Baltimore, was awarded to Geo. A. Paine, of Philadelphia, and the pier to a Baltimore firm.

Boston, Mass. — The contract for the erection of the Colosseum Building on Huntingdon Avenue has been awarded to Messrs. Kelly & Richards.

New Haven, Conn. — The committee on school buildings have awarded the contracts for the Lloyd Street School-House, that for the joiner-work to Henry S. Lauraft, and that for the mason-work to Bunnell & Sperry.

Newport, Ky. — The contract for furnishing stone for the workhouse was awarded to Charles Spinks.

Newport, R. I. — The bids for building the new engine house in the Second Ward have been opened. There were six bidders, the highest being $5,800, and the lowest $4,748, by H. A. Kaull, Alderman from the First Ward.

New York, N. Y. — Martin Deegan has the contract for the carpentry on the Insane Asylum at Ward's Island, at $15,150, and David Brown has the mason-work at $18,485.

Philadelphia, Pa. — The contract for building the Industrial Home for Blind Women, Messrs Wilson Bros. & Co., architects, was awarded to A. T. Richards for $28,949.

Warren, Mass. — The contract for building the new mill of the Cutler Manufacturing Co. has been given to parties in Fall River. The building is to be of brick.

INDEX OF CURRENT WORK,

Giving information concerning important buildings now unfinished.

[Architects and Builders are requested to aid the editors in making the information in this department full and exact. Notice of the completion of a building is particularly desired.]

Baltimore.

Railroad Office — Office for Baltimore & Ohio R. R. E. F. Baldwin, architect. Cost, $400,000. 214 x

Boston.

Stores. — Liberty Building. W. G. Preston, architect. Cost, $200,000

Hotel. — Hotel Vendôme. Ober & Rand, architects. 216 y

Brooklyn.

Hospital. — Eastern District Dispensary and Hospital. C C. Buck, architect. Cost, $35,000. 204 y

Hospital. — Hospital of St. Mary. Mr. P. C. Keely, architect. Cost, $200,000.

Chicago.

Hotel. — Hotel. T. V. Wadskier, architect. Cost, $30,000. 215 x

Asylum. — Home for the Aged. Cost, $25,000.

New York.

Store. — Store for Arnold, Constable & Co. W. Schickel, architect. Cost, $200,000. 210 x

Barge Office. — Mr. J. G. Hill, Supervising Architect. Cost, $146,000.

Church. — St. Paul's (R. C.). Mr. J. O'Rourke, architect, Newark, N. J. Cost, $500,000.

Office Building. — G. E. Harney, architect. Cost, $200,000.

College. — Addition to Columbia College. C. C. Haight, architect. Cost, $200,000.

Dwellings. — House for Cornelius Vanderbilt. G. B Post, architect. Cost, $250,000. — Houses for W. H. Vanderbilt. J. B. Snook and C. B. Atwood, architects. Cost, $400,000 and $300,000.

Club-House. — Union League Club-House. Messrs. Peabody & Stearns, architects, Boston. Cost, $250,000.

General.

Albany, N. Y. — U. S. Court-House. Mr. J. G. Hill, Supervising Architect. Appropriation, $305,000.

Atchison, Kan — Union Depot. Cross & Taylor, architects, Kansas City, Mo. Cost, $87,000.

Burlington, Io. — County Court-House. P. E. Hale, architect. Cost, $100,000.

Chester, Ill. — Penitentiary. Bell & Hackney, architects, Springfield. Cost, $850,000. 214 z

Chester, Penn. — Church of St. Michael. E. F. Durang architect, Philadelphia. Cost, $60,000.

Cleveland, O. — Church. Heard & Smith, architects. Cost, $40,000.

Cohoes, N.Y. — Hotel. Ogden & Wright, architects. Cost, $60,000. 207 z

Dayton, O. — County Court-House. Mr. L. Beavers, architect. Cost, $100,000. 213 y

Presbyterian Church. Wheelock & Clay, architects, Chicago. Cost, $60,000. 214 y

Denver, Col. — Stores. W. J. Edbrooke, Chicago, architect. Cost, $140,000.

Des Moines, Io. - Court-House. P. Hale, architect, Chicago. Cost, $86,000.

Detroit, Mich. — The Rotunda. Lloyd & Pierce, architects. Cost, $160,000.

Dorchester, Can. — Penitentiary. Thomas S. Scott, Ottawa, architect. Cost, $120,000.

Flushing, N. Y. — Chapel for the Academy of St. Joseph W. Schickel, architect. New York. Cost, $45,000.

Franklin, Ind — Court-House. G. W. Bunting, Indianapolis, architect. 215 z

Garden City, N. Y. — St. Paul's Cathedral School. Mr. E. D. Harris, architect, New York. Cost, $250,000

Hartford, Conn. — Courant Office. G. Keller, architect. — House for Cornelius J Vanderbilt. Cost, $50,000.

Indianapolis, Ind. — State House. Mr. E. May, architect. Cost, $2,000,000.

Lebanon, Pa. — St. Luke's Church. Henry M. Congdon, architect. Cost, $70,000.

Lincoln, Neb. — State Capitol. W. H. Wilcox, Chicago, architect. Cost, $400,000.

Mansfield, O. — Jail. D. W. Gibbs, architect, Toledo, O. Cost, $50,000.

Meridian, Miss. — Court-House. Moser & Tucker, architects. Cost, $25,000.

Middletown, N. Y. — Homœopathic Insane Asylum. C. Pfeiffer, architect, New York. Cost, $125,000.

Milwaukee, Wis — County Insane Asylum. H. C. Koch & Co., architects. Cost. $135,000. — Chamber of Commerce. E. T. Mix, architect.

Newport, R. I. — Casino. McKim, Mead & White, architects. New York. Cost, $70,000. 214 y

North Easton, Mass. — Hall for Oliver & Oakes A. Ames. Cost, $40,000. H. H. Richardson, architect, Brookline, Mass.

Omaha, Neb. — Trinity Cathedral. J. F. Stuckert, architect, Philadelphia. Cost, $50,000

Orange, N. J. — Music Hall. Silliman & Farnsworth architects, New York.

Utica, N. Y. — U. S. Court-House. Mr. J. G. Hill, architect. Appropriation. $250,000.

Wellesley, Mass. — Dormitory. Ware & Van Brunt, architects. Cost, $80,000. 210 x

Weston, W. Va. — Hospital for the Insane. Appropriation, $95,000. A. A. Lewis, W. E. Lively, E. Ralston, Executive Committee.

Williamsport, Pa. — Store. E. Culver, architect. Cost $100,000.

Wilmington, Del. — Court House. T. P. Chandler, Jr Philadelphia, architect. Cost, $66,203.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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ALL question of carrying on the designs of Brumidi for the rotunda of the Capitol is now, so far as the work of his own hands is concerned, forever at rest, with himself. Brumidi died in Washington on the day on which our last paragraph concerning him was printed. He was born in Rome seventy-three years ago. He had been at his profession full threescore years, if the accounts we hear of his history are true, for he entered the Roman Academy of Arts as a student at thirteen years, and began painting frescoes at once. He helped in the decoration of many Roman palaces, working with three other young artists, Podesti, Coghaetti, and Capalti, who were associated with him again in restoring the Raphael frescoes of the Loggie of the Vatican, during the pontificate of Gregory VI., predecessor of Pius IX. After the accession of Pius IX., Brumidi painted his portrait, and was made a captain in the National Guard. He took part in the popular revolution in Italy, in 1848, and after its collapse left the country and came to the United States. He made a short visit to Mexico in 1856, where he did some work as a decorator, and, coming back to Washington in the same year, was engaged to decorate the "Capitol Extension," and has ever since been employed on the building. He ornamented the vaulted corridors of the lower story of the Capitol skilfully in arabesques, after the manner of the Vatican Loggie; and covered the walls of the committee rooms and Representatives Hall, and the interior of the great dome, with historical paintings, beginning with the room of the Committee on Agriculture, where he did what is thought to be his most successful work. In the freshness of his strength and repute he was liberally paid for his work, and received forty thousand dollars for his paintings on the Cupola. But as his strength and vogue declined his compensation was reduced; while an unfortunate disposal of the money that he had received left him in poverty, which the small allowance he received from the Government for his last work did not effectually relieve. He was an industrious worker. His heart was in his last undertaking, the decoration of the great frieze of which we have spoken, and two days before his death he was still laboring with single-minded zeal, in spite of his infirmities, at his unfinished cartoons.

THE question, therefore, who is to take up the decoration of the Capitol, unfinished by Brumidi, is now more apposite than when we wrote before, and here the government officers have a serious responsibility on their hands, of which, we may trust, they will not hastily acquit themselves. A great deal of labor and money has been spent to adorn the Capitol with works of art, but except in a very few instances the art has not added glory to the building. In the undeveloped condition of American art a generation ago it was natural that a clever and experienced foreigner who chanced to be at hand should be chosen without question, for there were no Americans whose experience showed them to be the right men for such work. The presumption was in favor of the imported artist over the native. To-day the presumption is the other way. Brumidi's desire to have his own designs carried out, and by an artist of his own selection, was a desire which it would have been painful to put aside during his life: now that he cannot be wounded by it, the question is open for decision on its own merits alone, and with it comes the question whether it is desirable to carry out Brumidi's decoration at all or not. This, we have already said, is in our opinion not to be desired; nor do we believe that a painter who is of the right power to undertake a work of such magnitude as the decoration of the rotunda will be content to simply follow in Brumidi's footsteps. If, however, this were generally understood and accepted as a temporary makeshift, it would not be a point of great importance. We may fairly say that, considering the progressive condition of decorative art in the United States, and the fact that our artists are but lately beginning their experience of mural decoration, to which many of them are turning their attention with great interest, we cannot see that harm would be done if a work which offers such exceptional opportunities and hazards should be deferred for another decade.

AS supplementary to the notice of Gottfried Semper in a former number, it may be interesting to note that his papers are collecting in the hands of the persons who have charge of his estate. The collection consists of thousands of drawings, designs for his executed and projected buildings, studies of other architectural works, and sketches from the years of his extended wanderings. Besides these there is much literary material. A large part of the missing third volume of Der Stil was fortunately found in a condition which will allow its publication with the new edition of that work prepared by the son of the author, Professor Hans Semper, of Innsbrück. There are extensive notes and suggestions concerning the competitions, for so many of which Semper was a member of the jury of awards. His reports on these occasions were often elaborated to real monographs, which cannot fail to be of great interest and value. One of the latest of these was upon the sculptural decoration of the new museums of Vienna. The desirable collection of Semper's already published writings is also said to be under consideration. In the mean while a number of former scholars and appreciators of his genius have agreed to found in Zurich a Semper Museum, on a plan similar to that of the Schinkel Museum in Berlin. This institution is to contain a great part of Semper's own drawings, the designs and models of all his buildings, and will present a comprehensive view of the work of the great architect. A committee has been chosen for the execution of this plan; it is to be hoped that they will carry it out with every success. Perhaps even a greater honor is offered to the memory of Semper by the city of Dresden. The question what would be the most worthy tribute to the architect, who thirty years ago fled from the Dresden streets and was exiled from Saxony, was discussed, officially in the city council and publicly in the local press. A recent number of the *Dresdener Zeitung* proposes that the municipality, thus desirous of expressing its sense of Semper's preëminent abilities, should undertake an adequate publication of his works, that is, of his buildings and designs. As a museum is already planned for Zurich, and to set up a public statue is known to be contrary to Semper's desires, this suggestion seems to be eminently suitable. Such a publication would be of great general value and much more than a merely local expression of admiration.

WE read of the death of M. François Léonce Reynaud, a French architect and engineer, Inspector-General of Roads and Bridges, who is widely known outside of France for his treatise on architecture. He was born at Lyons in 1803. At eighteen years he entered the École Polytechnique; but certain political manifestations in which he took part obliged him to leave it in a year. He then turned to architecture, entered the École des Beaux-Arts, and on leaving it studied in Italy. After the accession of Louis Philippe he was recalled to the government service, and he was appointed a government engineer in 1835. He was appointed professor of architecture at the École Polytechnique two years later, and at the École des Ponts et Chaussées in 1840. His special duty was the construction of light-houses, of which he had the general direction, building the noted light-house of Brehat, which stands, like that of Eddystone, on a rock barely uncovered at low water and exposed to all the force of the sea. He was at one time also a diocesan architect. In 1856 he was

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made Inspector-General of Roads and Bridges, and after three years was appointed director of the École des Ponts et Chaussées. He was made a member of the Legion of Honor in 1839, and afterwards promoted to the grades of Officer and Commander. His Traité d'Architecture, in two quarto volumes of text and two folios of plates, is the standard work on the subject in the French schools. The first half of it is devoted to the mechanical construction of buildings, the second part to their design, illustrated by a generous selection of historical examples. Among treatises of equal range there is probably none that is of equal value to the student.

The Building Associations of Cincinnati, of which there are many, do not seem to be exempt from the difficulties and dangers of mismanagement to which other commercial ventures are liable. The laws of Ohio require that the division of the dividends and profits in such associations shall be deferred till the shares are fully paid up. This restriction, being naturally somewhat irksome to persons who are anxious for speedy dividends, has apparently been forgotten in the management of some of the associations, which have in consequence been summarily brought to account in the courts. The case of the Irish Building Association No. 2, lately decided in the Superior Court, is an example of some of the difficulties into which such organizations are liable to fall. The association was established in 1871 under a constitution which provided that the payments on shares should continue, and the mortgages for money advanced the members should remain uncancelled, until the accumulations of the association should be sufficient to pay each shareholder, on division, the full par value ($300) of his shares. After a few years of apparent prosperity, however, the directors passed an order allowing members to withdraw with a given division of profits, or cancel their mortgages on given payments after a date fixed in advance, it being assumed that the condition of the association would allow of closing up its affairs at that time. When the time arrived, however, the greater part of the members having withdrawn, it appeared that there was a deficit in the accounts of the association, which the remaining members would be called upon to make up, while those who had taken advantage of the opportunity to withdraw beforehand had gone off with a profit. A case made on the question of the management of the association brought out the decision that the permission to members to withdraw in advance of the final settlement was illegal, that all the discharged members must be holden to their membership, and the affairs of the association be put into the hands of a receiver until the payments and losses should be readjusted. In view of the restrictions which the law imposes on the associations, a convention of them was called a short time ago which proposed so to amend the statutes as to allow the associations to distribute eighty per cent of their earnings as they go, reserving only twenty per cent as a security fund. On the other side, a bill has been introduced into the legislature which repeals all the statutes under which the associations are chartered. This would prevent the formation of any new ones, and they would disappear from the State as the existing ones were gradually extinguished.

The perennial question of the cleansing of the city of New York is now before the legislature of the State, three bills to reform the street-cleaning system having been brought forward in this session. The committee of the Assembly on the Affairs of Cities has therefore sent out circulars asking for information, while it has guarded itself against intrusive wisdom by declaring that no unasked testimony will be received. The present system of street-cleaning by a bureau of the Police Department, substituted some time ago for the contract system when that became intolerable, has not proved a success. The "cremation" scheme of two or three years ago was not long persisted in, nor has the habit of dumping the refuse into the mouth of the harbor from scows within the reflux of the tide been managed in a way to commend itself. Hence the questions of the circular: Whether the duty of street cleaning should be left with the Police Department, or a separate department should be established for it; whether it shall be put upon a special Board of Supervision, composed of the Commissioner of Public Works and the Presidents of the Board of Health and the Police Board, or shall be transferred to the Department of Public Works; or finally, whether it is better to return to the contract system. The committee further inquires whether it is not possible to simplify matters by separating the garbage of the city from the street sweepings and ashes, and whether in that case the garbage could not be sold to farmers, the street sweepings and ashes be used for filling, and the dumping grounds be made therefore unnecessary; or, if this is not practicable, where new dumping grounds can be provided, and whether it is worth while to construct large scows, after the example of Liverpool, to take the dumpings out to sea.

There is no knowing what response experience may give to these suggestions of method, but there are some that it is safe to say will not or should not be carried out. The garbage might perhaps be separated in a considerable degree from the street sweepings, and so also the ashes, in the better parts of the city, where the inhabitants themselves make the separation, though in the poorer parts it would be difficult to enforce it. We doubt whether a steady market could be found which would relieve any great city from its garbage, a material which ought to be got out of the way regularly, as fast as it is delivered. The ashes, if it could be kept undefiled, might very well be used for filling; but to sell the street sweepings for the same purpose is a thing which should not for a moment be thought of, even though it were found possible to prevent refuse from houses from being mixed with it. Containing probably one half its bulk or more of animal refuse, it is only one degree less unwholesome than the garbage itself, and the proposal to make such a use of it shows a curious want of knowledge of the conditions. The placing of the dumping grounds is certainly an embarrassing difficulty; but this is not the Utopian way to get rid of them. A considerable embarrassment will be relieved when the authorities and the public have learned to face the fact that the proper disposal of the refuse of cities is after all an expensive matter, and that inasmuch as sanitary science furnishes no way yet of doing it cheaply, it is better for the present to make a liberal allowance and do it thoroughly.

The present plan of carrying the refuse out into salt water in scows has not, as we have said, worked very satisfactorily. The scows are not seaworthy, and in rough weather they do not go out at all; in good weather they drop their deposit where a great deal of it comes back to plague the shore. A proposition was made some two or three years ago to build large steam barges which should be seaworthy in all weathers, and could deposit the refuse twenty-five miles out to sea, but it has not been done. Just now we read that a steamer has been built on the Clyde for the corporation of Liverpool for this very use. The hopper-barges which were before used, and which it has been suggested should be adopted in New York, being found not to deliver their freight with sufficient readiness, the new steamer has been built with a long well widening downward and divided into ten compartments, with doors to open simultaneously, and a powerful steam pump to wash the contents thoroughly from the tanks. The steamer is built to carry three hundred and fifty tons of dead weight, says a correspondent of the *Chicago Tribune*, and will make nine miles an hour. It might take more than one such steamer to relieve New York of her superfluous matter, but if, as it is said, the cost of carrying out her refuse amounts already to five hundred dollars a day, she could afford it. The suggestion is made that the whole sewage of a city might be carried well out to sea in similar vessels, and doubtless it would be a relief of a great difficulty if it could be done; but when we consider that the liquid sewage of Liverpool, amounting on the average to thirty gallons per head, is upwards of sixty thousand tons daily, and that of New York probably twice as much, it looks like a rather appalling undertaking to provide a fleet adequate for it.

THE ACOUSTICAL IMPROVEMENT OF LARGE HALLS.

The acoustic defects of large buildings are brought about by one or more of the following acoustic phenomena, and in some cases by all combined. (1.) Dispersion, by which in large and lofty buildings, such as many of the magnificent Gothic cathedrals, the greater part of the sound waves produced by the human voice are free to wander away through great distances, until they expend themselves among the arches and galleries of the roof, and in the cavernous recesses of the chapels and transepts, leaving but a small proportion to reach the ears of the people in the body of the hall. (2.) Resonance, by which discordant reverberations are produced, commencing nearly simultaneously with the note or sound by which they were originally induced, but continuing for some time after the original sound has ceased, and, therefore, interfering with the notes that follow. This is a common defect of domed and vaulted buildings, and the phenomenon may be observed in empty houses, and very often in tunnels, in which it is combined with reflection or echo, with which it must not be confounded, although the two are seldom, if ever, found apart. Resonance is chiefly attributable to the sympathetic vibration of the air held within the vaults of the roof, or

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within a dome or gallery, set up whenever a note is sounded whose period of vibration corresponds with that of the space in which the resonance is produced. But what is perhaps the most serious cause of defect in moderate-sized buildings is (3) the acoustical phenomenon of reflection or echo. It is by acoustical reflection that the sound-waves travelling away from the speaker in all directions are arrested in their course by walls, ceilings, arches, and other reflecting surfaces, and are thereby prevented from exhausting themselves in space by being turned back in directions determined by the nature of the reflecting surfaces, and their positions with regard to the original source of sound; and were it not for the comparatively slow speed with which sonorous vibrations travel, reflecting surfaces would improve and intensify the original sound in both large and small buildings, much in the same way as a number of mirrors in a room improves its illumination by reflecting back a large proportion of the light which would otherwise be dispersed or absorbed.

It is generally considered that the quickest speed of talking which can be articulated clearly and heard distinctly is five syllables per second, and as the velocity of sound is only 1,125 feet per second, it follows that in the time which elapses in quick talking between the articulation of one syllable and that of the next, the same sound could travel 225 feet, so that if a reflecting surface be 112½ feet distant, the reflection or echo of the first syllable should be heard at the moment the second syllable was being articulated, and would therefore clash with it as would the second with the third, and so on, and if there were other reflecting surfaces at distances two, three, and four times the distance of the first, their reflections or echoes would interfere with the second, third, and fourth syllable respectively from the first spoken syllable; and this clashing or interference of sounds, so destructive to the audibility of a speaker, is almost more serious for a singer, as notes are introduced at the wrong time, giving rise to discords and false combinations, and producing what has been called a "wooliness of outline" in the music which is being performed.

Reflecting surfaces in close proximity to the source of sound improve and strengthen it, as a reflector behind a source of light intensifies its front beams; it is only when the distance of the reflecting surface from the source of sound is such that the time occupied by a sound-wave in traversing that distance and returning again occupies, say, the fifth of a second of time or more, that the reflection becomes an echo and is injurious to the acoustical properties of the building. In fact, the difference between what is called a useful reflection and an injurious echo is merely one of distance. The common sounding-board above a pulpit — which in this country is too often a disfigurement and an outrage upon architectural taste, and in Belgium and some other Continental cathedrals is made an exquisite piece of æsthetic ornament — is an instance of the use of a reflecting surface close to the source of sound, not only for directing the sound-waves on the audience, but for shielding them from two of the evils to which we have just alluded, namely, dispersion and echo. If sounding-boards of the same angular dimensions with respect to the speaker were placed at distances from him greater than 112 feet, they would do nothing but harm, injuring by so many more sources of echo the acoustics of the structure in which they were fixed.

Closely allied to and associated with the phenomena of reflection and echo is that of (4) interference, whereby sound-waves are neutralized or intensified, according as the return or reflected waves meet others advancing in such a manner as to destroy or to coincide with them respectively; in other words, as they meet crest to trough or crest to crest, the former producing more or less a silencing of the sound, and the latter an augmentation of it; and as these silencings and augmentations, from the very varied wave-lengths of the sounds constituting either musical compositions or articulate speech, are altogether promiscuous in their occurrence, it follows that audition is, by the phenomenon of interference, confused to a very serious extent.

There is one more source of acoustical defect in large rooms, and that is (5) sympathetic vibration of sonorous bodies within it; this phenomenon is closely related to that of resonance mentioned above, but it differs from it in the manner in which it is produced. It is well known that a piano or a harp placed in a room in which a concert is being performed, although not being played upon, gives out a large proportion of the music being performed, and a person sitting near it can hear the music coming from it, as if some etherial hand were playing upon it with the lightest possible touch. This very interesting effect is nothing more than the taking up by each string the vibrations of the air surrounding it which was thrown into tremor by notes emitted by other instruments whose period bore a harmonious relation to that of the string so affected. But it is not only strings that are so influenced — metal plates of various sizes and thicknesses, membranes, such as a drum-head or a tambourine, are all influenced by sympathetic vibration, and give out corresponding notes. It must be familiar to many persons that even a common hat held in the hand in the presence of loud music is thrown into a state of vibration when certain notes are sounded, which vibration is distinctly sensible as a tremor to the hand holding it, and we may say generally that anything capable of being thrown into vibration with sufficient rapidity to constitute a sound may be thrown into sympathetic vibration by corresponding sounds produced with sufficient force in their neighborhood.

We think we may safely say that all the above phenomena, with the exception, perhaps, of the first, *i. e.*, dispersion, are, with respect to their acoustic influence upon a building, either decidedly useful, harmless, or positively detrimental, according as the distance of the disturbing body from the source of sound be small or great. Thus the cavity of the human mouth, as well as the important parts of most musical instruments, are resonators, which not only greatly improve the sound, but to which their quality, value, and character are chiefly due. Again, reflectors, such as pulpit sounding-boards and walls in close proximity to the speaker or singer, augment and intensify the effect as a mirror augments a light, and to the resonance and sympathetic vibration of solid bodies is due the reinforcement and enrichment of sound produced by instrumental sounding-boards, such as that of a piano-forte, or those of other stringed instruments, such as the violin, violoncello, and double bass, and of which no more striking illustration can be given than the familiar one of placing the stem of a vibrating tuning-fork against a resonating body, such as a table or hollow wooden box.

Mr. Engert's invention is the utilization of the phenomenon of the sympathetic vibration of metallic plates placed in the neighborhood of the performers, for taking up the notes as they are sounded, and giving them out again so as to mingle their synchronous sound-waves with those produced by the original notes, and thus to intensify them and give them more body. With this object he places behind and about the platform a number of sets of sheets of steel of various thicknesses and areas, suspended to framework and attached to one another by spiral springs, so that they are free to move within certain limits in every direction, and being of very different thicknesses and size, each plate can pick out, as it were, its own set of notes, which it reinforces, and those notes by which any particular plate is uninfluenced are taken up by other and different-sized plates, whose periods of vibration correspond to a different set of sounds. At a trial concert, recently, Mr. Engert had placed behind the performers five sets of suspended steel plates, one set being at the back-centre of the platform, and the other being in two pairs, one on each side of the centre, the whole being arranged more or less in an arc of a circle embracing the platform; and in front of the platform in the middle were three smaller sets of plates, behind which and close to them was placed the piano-forte. Each set consisted of five steel plates of different sizes, suspended in a vertical position parallel to one another, about an inch apart, by spiral springs, and having a second set of spiral springs which acted as distance pieces between them. The five sets at the back of the platform were enclosed in flat vertical cases, the fronts of which consisted of a set of louvre boards, which could all be opened or shut together exactly like the opening or closing apparatus of the swell of an organ, and by closing any one set of louvres that particular set of plates could, for experimental purposes, be thrown out of use, and with a similar object the smaller sets in the front of the platform were provided with curtains which could all be simultaneously drawn aside or closed up by means of strings.

During the performance of the concert there was unfortunately but one opportunity of testing the effect of the music, first with the apparatus in use, and then with the louvres and curtains closed up, and this was afforded by one of Signor Foli's songs being "encored" and repeated, the apparatus being in use during the first performance, but shut off during the repetition. That there was a difference between the two, no one with any pretence to a discriminating ear could be insensible, but we venture to think that the question whether the one was an improvement on the other or not was a matter purely of imagination, and from the opinions of others with whom we compared notes, we think that if a poll had been called of the impressions of those present as to whether the apparatus improved the effect or not, the ayes would have been about equal to the noes. It is only fair, however, to state that it was announced by the inventor that the apparatus was far from being in good order, and in fact that some of the suspension wires had been broken altogether through not being of sufficient strength to support the weight of the plates. We must confess that we do not see the applicability on any extended scale of such a system to the improvement of large halls, for the reason cited above, namely, that sympathetic vibrations, reflections, and resonances, in order to be of any use for the improvement of sound, must be close to its source, and therefore the amount of apparatus for the production of such phenomena must be very limited, and can, in large buildings, bear but an insignificant proportion to the size of the chamber, and to the many sources of defect which vastness of size introduces. We can readily believe that if the velocity of sound were equal to that of light, the multiplication of sets of Mr. Engert's vibrating plates placed all over and above the interior of a building, in the roof and around the galleries, might greatly augment and perhaps improve the sound, but as it takes a decidedly appreciable time for a sound to travel a distance which can lie within a moderate-sized concert-hall, we cannot but think that every set of apparatus placed within the building, except in the immediate vicinity of the platform, would add to the discordant reverberation, add to the echoes produced, and would, in short, be a remedy far worse than the disease it is intended to cure. Passing from general principles to matters of detail, we fail to see the advantage of mounting the plates upon springs. If we understand the phenomena correctly we are under the impression that the sort of vibration of the plates which is de-

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sired is a membranous one, and not a bodily swing of the whole plate as a mass, which could hardly be rapid enough, or be in a condition to be imparted to the air so as to reproduce a musical note; and if this view of the case be the correct one, the plates might be rigidly fixed by their upper edges, or even all round, like the head of a drum, and their membranous vibration would not thereby be destroyed, but rather improved.

We are the more sorry to take this view of Mr. Engert's invention (to which the name Orpheophone might not be inaptly applied) from the fact that we understand it is the result of an experimental research extending over more than forty years; it may be, however, that we have have not properly appreciated the reasoning by which he was led to his conclusions, or by which he anticipates being able by his invention to impart the most admirable acoustical properties to buildings of the worst acoustical construction. If we have misunderstood him we shall be only too glad to rectify the error by affording him an opportunity for the explanation of his undoubtedly ingenious apparatus. — *Engineering.*

A SIMPLE TEST TO ASCERTAIN THE PURITY OF THE AIR.[1]

Lange [2] gives a simple method of measuring the amount of carbonic acid in the air. It depends upon the fact that carbonic acid in lime or baryta water produces a precipitate of carbonate of lime or baryta which shows itself by clouding the previously clear solution. To make the test he used six glass bottles of different capacities.

No. 1, of 450 cubic centimeters capacity.
" 2, " 350 " " "
" 3, " 300 " " "
" 4, " 250 " " "
" 5, " 200 " " "
" 6, " 150 " " "

When these are quite dry and clean some clear fresh limewater is made, fifteen cubic centimeters of the solution measured out, and poured into the smallest of the bottles, containing the air of the room to be tested. The bottle is stopped up and thoroughly shaken. If no cloudiness results therefrom the same experiment is tried with bottle No. 5, and so on, until a distinct cloudiness is discernible. A cloudiness obtained with the sixth bottle indicates at least 16 parts of carbonic acid in 10,000 of the air, an impurity altogether inadmissible, so that no smaller bottle need be used. The fifth shows 12 in 10,000, the fourth about 10 in 10,000, the third 8 in 10,000, or a satisfactory condition of the air. The third shows 7 in 10,000, the second 6 in 10,000, an unusually pure indoor atmosphere; the first indicates from 4 to 5, certainly under 6, in 10,000, a condition rarely obtained except in the open air. In order to distinguish with greater ease and certainty when the cloudiness is sufficiently strong, small pieces of white paper with a cross marked on each in pencil may be pasted on the outside of the bottles below the water level, with the cross mark turned inwards. When this cross-mark can no longer be seen through the solution it may be assumed that the cloudiness is sufficient.

From the experiments of Eresmann [3] it is found that from the consumption of 1,000 liters (about 35 cubic feet) 681 liters of carbonic acid are produced. A burner consuming 140 liters per hour (an ordinary 5 foot burner) generates in this time 92.8 liters of carbonic acid, about equal to that produced by four grown-up persons, and in respect to organic substances it corrupts the air as much as five grown-up persons.

According to Pettenkofer, a strong workman, weighing 75 kilograms, and 28 years old, produces hourly 22.6 liters of carbonic acid by day while at rest, and 36.3 when at work. A "feeble tailor," weighing 53 kilograms, and 26 years old, produces 16.8 liters while at rest during the day, and 12.7 during the night.

Scharling's [4] observations give the following table: —

	Age.	Weight in Kilos.	Hourly Production of Carbonic Acid in Liters.
Boy	9½	22.00	10.8
Girl	10	23.00	9.7
Youth	16	57.75	17.4
Maiden	17	55.75	12.9
Man	28	82 00	18.6
Woman	35	65.50	17.0

AMOUNT OF FRESH AIR REQUIRED PER HEAD PER MINUTE.

To calculate the amount of fresh air required per minute by each occupant of a room we will assume the number of respirations per minute to be 17 (average obtained by the writer from five different persons at rest). At each breath the volume of air respired amounts to about one half liter, and contains, say, 43 parts of carbonic acid to 1,000 of air. If we suppose the outside air to contain 0.5 parts per 1,000, and we wish the limit of impurity in the room to be 0.7 parts per 1,000, then each half liter of outside air introduced will add a volume containing $0.7 - 0.5 = 0.2$ parts in 1,000 less carbonic acid than is required. The half liter respired contains 43 parts, and as this breath cannot be removed instantly (unless each occupant breathes through a tube communicating directly with a ventilating flue), it must be diluted with as many volumes of the incoming air as are sufficient to raise it to the required purity; *i. e.*, $\frac{43}{0.7 - 0.5} = 216$ volumes of one half liter each for each respiration. For 17 respirations we have 3,672 half-liters = 1,837 liters, or 1.8 cubic meters. General Morin gives for hospitals from 1 to 2.5 cubic meters per head per minute; for theatres from 0.7 to 0.8 per minute; for assembly rooms, long sittings, 1.0 per minute; for short sittings, 0.5 per minute; schools for grown-up pupils, from 0.4 to 0.5; schools for children, from 0.2 to 0.3. A simple rule is to allow *for each individual one cubic meter and for each unventilated gas-burner three cubic meters per minute.*

ALLOWANCE TO BE MADE FOR NATURAL VENTILATION, OR VENTILATION THROUGH THE PORES AND FISSURES IN THE BUILDING MATERIALS.

The supply of this quantity of air is, in ordinary buildings, partly obtained by *natural ventilation*, though to what extent is at present unknown, as the matter has been but little studied. It is extremely important, therefore, to investigate the subject, and to ascertain, if possible, what allowance should be made in our calculations for this air supply, and either to regulate its quantity at pleasure or to repress it altogether.

Natural ventilation is directly dependent upon the permeability of the building materials, and upon the amount of air pressure upon the surfaces of the external walls.

Many of us have observed, especially in unfinished houses, while standing near a bare brick wall on the windward side of the house, that a strong breeze passes easily through the brickwork and produces a perceptible draught in the interior. This pressure is dependent upon three considerations, which are given by Lange as follows: —

1. The difference of temperature between the air within and without the place to be ventilated.
2. The diffusive tendency of the two masses of air separated by the walls of the house.
3. The strength and direction of the wind.

Lange shows that the difference of temperature has but little influence upon the amount of natural ventilation compared with that produced by the wind. It is impossible by any experiments which can be made on an actual building to determine accurately the part played by the temperature alone as distinct from the wind and diffusive tendency of gases. But experiments may be made to advantage on a small scale and with apparatus especially designed for the purpose.

THE WATER-COLOR EXHIBITION, NEW YORK.

This, the thirteenth, may certainly be noted as the most successful of the Water-Color Society's annual exhibitions. The public throngs to it, the critics are pleased by a general excellence never before equalled, and the artists must be gratified by sales that have been great from the very beginning.

There are but few ambitious works in the collection, and those few are far from the best. But the average merit is so high that it amply consoles for the lack of any one thing that could be called very impressive or very fascinating. Here and there hang samples of the detailed, conscientious, utterly mistaken and inartistic work that formed the staple of the society's first exhibition. But to-day, such drawings are scattered amid a mass of truer work that half obliterates their effect upon the memory. When I speak, however, of a high average in the work, I do not so much mean that the results are in most cases very valuable, as that methods and manners have improved, that the true aims of the art have come to be better understood, and that the efforts of the majority of workers are tending in the right direction. It is not necessary to discuss what the total effect of the exhibition would be on a foreign critic whose mind had not been prepared by a previous knowledge of American work, though I believe such an effect would be far better than we could have anticipated a few years since. Criticism, to be useful here, must consider our past a great deal for comparison, and our present chiefly as the earnest of a like, but ever-improving future. That we are right in so considering it — in cherishing each bit of individual and clever work as a first fruit prophetic of far richer yields from its own or kindred stems, rather than as the final result of a complete development — is attested by the fact that it is year by year the newer and ever newer names that first attract our interest, and that sign the most distinctive work. I believe it is not alone the vivid impression which a novelty is apt to make upon the mind that inclines one to cite first this year Mr. Muhrmann, Mr. Blum, Mr. Kappes, Mr. Dewey, and one or two others whose names, like these, we had heard for a year or two, perhaps, and hints of whose ability we had already seen, but who have now come out more decisively than we could have anticipated.

There is no more difficult task of the kind than to write intelligibly of water-color drawings. By as much as they are slighter and

[1] This paper by the writer of the Open Fire-Place articles will be incorporated with those articles in their separate form.

[2] C. Lange, Ueber Natürliche Ventilation und die Porosität von Baumaterialien. Stuttgart, 1877.

[3] Untersuchungen über die Verunreinigung der Luft durch künstliche Beleuchtung und über die Vertheilung der Kohlensäure in geschlossenen Räumen. Zeitschrift für Biologie, vol. xii.

[4] C. G. Lehmann, Handbuch der physiologischen Chemie. Leipzig, 1854.

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more intangible than paintings, and more fitted to represent transitory moods and quickly seized impressions, by so much are they harder to characterize, by so much more they refuse to transmit the spirit of their excellence, the essence of their diversities, into critical phrases. Moreover, their close juxtaposition in a gallery is worse for them than for work in oils, so much more solid and definite and self-asserting. In *aquarelle* the most fragile work, if I may use such a word, is usually the most artistic, and is just the work, of course, which suffers by close contact with uncongenial things. When I saw Mr. Frank Currier's drawings, for instance, last year, it was impossible to mistake the value of most of them. But it was just as impossible to imagine how great that value would show itself to be when they were removed from their deadly surroundings at the Academy. I afterwards saw some of them well hung in a large room and marvelled at their increase of beauty, at their complete and charming intelligibility. The Academy rooms, moreover, are, for shape, the worst in the city. Long and narrow, with encumbered centres, it is very often almost impossible to get the right point of view at all. When the rooms are full, the impossibility becomes absolute. One must run counter to the main stream of visitors to get even a fair look at the best things. Any place more discouraging than the corridor, with its three feet of breadth, and its heavy shadow on the upper wall, I cannot imagine.

Mr. Currier sends nothing this year himself; but either his influence or the same current that influenced him has been at work, and we see many results of value. Among such are Mr. Muhrmann's drawings, which, strongly as they interest us here, would surely be seen to better advantage in any other place. His eleven numbers show a great diversity of theme. There are two or three portrait studies, a large church interior (No. 199), and a number of out-door scenes. The treatment of all is remarkable for its breadth and airiness, and the resultant effect of atmosphere and suggested space is admirable. These are merely among the things that *aquarelle* is calculated to render with unrivalled success, rather than solidity and detail and elaborate realities of surface and texture. As I have said, the charm and force of such work as Mr. Muhrmann's are alike difficult to characterize. How can one tell in words why his rapidly worked-in turkeys and cabbages and apple-women are so infinitely more artistic, and so much truer as well, than the would-be poetical figures and would-be picturesque landscapes, alike carefully sought and patiently wrought, of the elder school? Mr. Kappes shows figure portraits only, — the most elaborate of them the least admirable, but two of them, Nos. 179 and 537, of great excellence. Here, again, the subjects are most unsought. A street-boy cutting a water-melon is, perhaps, the best. Mr. Dewey's little landscapes show a distinctly poetical temperament, — a thing that even the best work on the walls does not often reveal. The same may be said in a lesser degree of Mr. Francis Murphy, whose Warm November Morning, No. 59, is very good.

Mr. Robert Blum's work is one of the decided attractions of the year. With him, especially, it is promise even more than achievement that interests us, if we except his study of a head (The Grimace, No. 641), which is in itself a capital thing. The great variety of his work is its most hopeful sign. It would, indeed, be a pity if such cleverness as his should, as it so easily might, degenerate into mannerism before the artist finds the true manner that shall suit him best. Mr. Blum paints Japanese scenes, developed, I am told, from his inner consciousness, assisted by Japanese picture-books, for he has never been where he could study them from life. Still, no one who has seen his Fish Stall, No. 222, will greatly blame him for so doing. Then there are some pen-and-ink figure studies of his which the public does not notice, perhaps, very generally, but which those who have some idea of technical accomplishment are apt to pause before. If their comment is most often, "A clever *pastiche* of Fortuny," they must allow that to follow — not copy — Fortuny, even at a considerable distance, is no small feat for a young artist, and no great harm if he do it for sport or exercise, and not with the deliberate intention of resting there forever. If we look finally at Mr. Blum's Connoisseur, No. 88, we see still another style of thing, and as delicate a bit of workmanship as one could covet.

Mr. Alden Weir gives us something this year the like of which I have never seen from his hand before, however many such treasures his studio may have been holding in reserve. He, too, has been touched by the spirit that stirred Mr. Currier, and to the very best purpose. His tiny bits of paper are fascinating, and one of them, No. 303, a scene in the forest of Fontainebleau, is certainly, spite of its six inches by four, one of the strongest and best things in the place. To be unreservedly admired are an admirable figure by Mr. Shirlaw, No. 238, a clever little study by Mr. Chase, No. 213, and a landscape by Mr. Macy, No. 587, Beach at Naushon Island. Mr. La Farge is represented by some little drawings on the wood which exhibit all his indefinable charm of sentiment.

Some of Mr. McCutcheon's work is to be commended, notably his High and Dry, No. 289; also Mr. Douglas Polk's Stolen Felicity, No. 572, and Mr. F. S. Church's Fisherman's Home, No. 256. Mr. Hopkinson Smith's drawings are very good this year. He makes a far better show than ever before. I cannot think the treatment of his Seabright, No. 527, very successful, however. To use body color in such a solid mass as this broad white water is surely less effective than to make the paper do its own work, as it does, for instance, in Mr. Reinhart's News from Home, No. 745, which hangs not far away. Nor is this the only one of Mr. Reinhart's drawings to which one may turn with the greatest pleasure. Mr. Henry Farrar's pictures are numerous and pleasing, but the smallest and least ambitious are surely the best. It is in the foregrounds of Mr. George Smillie's many attractive pictures that we find his greatest skill displayed. A portrait study by Miss Cassatt attracts attention for the cleverly rendered head. The rest of the figure is badly drawn, and the whole by no means equal to her best work. The best flower-piece is, perhaps, Mr. Hugh Newell's Lilacs, No. 80, which possesses a delicate charm of color that is eminently lacking to his figures. Mr. Swain Gifford, Mr. Charles Parsons, Mr. Quartley, Mr. Nichols, and Mr. James Smillie show good work of their average quality. What shall I say of other work, signed, too, by well-known hands, and showing their usual level of achievement, when such a statement cannot be understood to carry any praise with it, except the somewhat doubtful approval that may follow patient application? There is nothing new to be said of Mr. Bellows's figures, or De Luce's, or Mr. Wood's, or of Mr. Edward Gay's landscapes, and it is less necessary, year by year, to repeat the old fault-finding, as it seems less likely that they will exert an influence on the younger generation of artists. The public still cleaves to them, still clusters round Mr. Wood's Pop-Corn Seller, and Mr. Brown's Homeward Bound. For this there is no remedy in preachments. One has no consolation but to be thankful in a selfish way that there is more open space left about the unobtrusive things one cares especially to see. Mr. Satterlee one had formerly some hopes of, but he seems to be steadily retrograding. He is less good than ever today, far below his last year's level. Mr. Bruce Crane's landscapes may be properly examined after one has convinced one's self that a ready wrist and free color are desirable things in *aquarelle*, and that an impression quickly caught and given is a thing to be proud of. His drawings point the lesson that it must be a real impression, not a simulated one, and that the color, so careless in appearance, must combine itself truly from the proper point of view. Looking closely at them we hope to find a point of observation whence this may be found to happen for Mr. Crane's pictures. But the further away we get, the more patchy and confused and unreal they are seen to be.

Mr. Tiffany, Mr. Linton, and Mr. Winslow Homer are unrepresented this year.

There is some good foreign work on the walls, notably two landscapes by Anton Maure, which give the sanction of authority to the principles just advocated. Look at the light and out-of-door breeziness on his paper, the atmospheric texture, if I may so say, and then examine his quick and simple and transparent *technique*, even the touches of body-color being laid on with so light a hand as scarcely to look like such. It is truly a magic art that can create so much out of so nearly nothing in the way of pigment and labor. There is, moreover, a Clays, a moonlight water view, which to me is not so satisfactory as his work in oils, an excellent figure by Tezzos, My Kitty, No. 121, and good things by Narira, Detti, Detaille, Languinetti, and some others. A large Marny is hung so high in the corridor that one cannot see it, and the same may be said of a crayon head, given as an Agostino Carracci. The catalogue leaves one in doubt whether the "Van Laer," opposite the number of some excellent tiny landscapes should mean owner or artist, while the signature upon them seems to be "G. P." They look more like foreign work, Dutch or Flemish, much as one would like to claim them for some countryman.

In the Black and White room the most striking things are by foreign hands, — a very fine large etched portrait of himself by Desbontin, and some of Mr. Haden's magnificent work, notably the Windsor Castle, with the fine foreground figures. It speaks well for the work of our own etchers that it is not entirely killed by contact with such giant's play as this. There are several frames of old etchings by Rembrandt and others which delight those who already care for such things, and must prove instructive to the many who are beginning to learn about them. A large etching by Jules Jacquemart, after Lionardo, is very beautiful, and the expression of the original is almost exactly reproduced. Is not this high praise when the original has been the Mona Lisa? A half-length crayon portrait-study by Mr. Gortelmeyer well deserves notice.

It is impossible just now, when they are the very battle-ground of critics, to touch in a casual way upon the engraver's work (*per se*) that is shown, or upon the drawings done for him by others. One would needs begin by making a full profession of faith on all points of the subject, a task that may well be shirked in a paper that professes to treat of very different things. The same consideration makes it difficult to speak of the majority of work shown at the recent Black and White Exhibition held, as before, under the auspices of the Salmagundi Sketch Club. There were some drawings, however, that were interesting from a strictly pictorial point of view, — some sketchy bits of Mr. Shirlaw's, Mr. Lathrop's portrait of Edison, some of Mr. Kappes's numbers, and two heads by Mr. Chase. These last called for simple commendation, with Mr. Blum's work, showing a most healthy diversity of style. Of course the value of such diversity was far greater here, where it was shown in mature work, not in the experiments of one who does not yet feel his footing quite sure beneath him. Mr. Chase's study-head, No. 229, was life-like and excellent, but antipodal in its clear outline and academic style to the dashing pen-and-ink portrait of Wilhelmj. How

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had the forms been kept so true, one wondered, where not an outline was followed, and how had the marvellous sweetness of expression been rendered by such broad, reckless strokes? One questioned more than ever in this exhibition what may be the object of painting large canvases in black and white oils, for they had not always been done for engraving's sake. They are of necessity ugly and undecorative in themselves and one cannot imagine their being an especially good medium for expressing any given idea, or representing any given thing.

We had been told that the Artists' Fund Exhibition was to be a good one this year. So it was, perhaps, for an Artists' Fund, as the name has been found synonymous in past times with the worst possible work America could compass. But this year, although there may not have been many pictures to be eagerly coveted, there were some that one need not refuse to hang on one's wall, did one win them, say, in a lottery, or find them in one's Christmas stocking. Among the worst things were Mr. Lang's figure subjects, Mr. Hicks's Supper Time, No. 73, Mr. Addison Richard's Ten-Mile River, No. 7, and Mr. Grey's Favorite Pastime, which represented, apparently, a huge wax doll decorating pottery. Amid the better work was Mr. Quartley's, Mr. Eastman Johnson's, Mr. Wiggins's, Mr. Swain Gifford's, and Mr. Greatorex's. The best thing of all, to my taste, was a little landscape by Mr. Hennessy, The Old Church at Criquebœuf; and his Bonjour Maman was very good likewise. The prices obtained at the sale averaged high. There were about one hundred pictures, and they sold, including the frames, for $20,585.

Sales of picture collections here have been rather numerous this winter, but there have been none of very great interest. The Sherwood and Hart collections, which were sold together, contained some very good things of the French and Spanish schools, most of them owned by Mr. Hart. The Duprés were good, and there was a Slave Market by Decamps, whom one sees but seldom this side of the water. A Wilhelm van Mieris, which has come several times to the hammer within the last few years, might well have been purchased for some public gallery. It was a good example of the master, and, fourth-rate though he be, in his own school, showed how his textures and surfaces shame, for truth and minuteness, the efforts of the modern microscopists! The Decamps, too, would have been a good purchase on account of the public. Rossi signed a lovely lady's portrait, of the Louis XVI. epoch, and Rico's landscapes were admirable for the out-of-door effect of their clear light greens and blues and whites. The so-called Munich collection, recently sold, contained a capital Kowalski, The Meet. His pictures interest one more and more. A large Venetian Scene, only "attributed" to Turner, seemed to puzzle the critics. They dared not say yea or nay, apparently, — only "a bad Turner or a very good *pastiche*." In the Nathan collection, which went off a few days since, were sold, among others, at low prices, three Boughtons, a clever little Kowalski, and a capital picture by Otto Piltz, of Weimar, Stripping Feathers in an Old Woman's Home. Public taste is a curious thing. This was a fresh and really admirable piece of work, measuring 37 by 24 inches, and containing many figures. It brought only $400, and very good Clays only $790. A frightful Baugniet, on the other hand, sold for $880, a Meyer von Bremen, rather more objectionable than usual, for $2,100, a Bouguereau for $2,900, and another, the well-known Crossing the Stream, for $6,600. The only really good picture that ran up to anything like these prices was a Zamacois, 12 inches by 16, that brought $4,550. The sum was not reported which secured one of the best pictures in the collection, a flower-piece by Mademoiselle Cuno, of Brussels, wonderfully delicate and admirably colored.

M. G. van Rensselaer.

THE ILLUSTRATIONS.

HOUSE FOR E. STANWOOD, ESQ., BROOKLINE, MASS. MR. C. S. LUCE, ARCHITECT, BOSTON, MASS.

DETAILS OF THE SAME.

ST. DENIS'S R. C. CHURCH, LOCKPORT, ILL. MESSRS. EGAN & HILL, ARCHITECTS, CHICAGO, ILL.

Lockport church, about forty miles from the city of Chicago, is built of local limestone, rock-faced ashlar, with a finish of the same material. The interior is finished in stained pine, with open-timbered roof, plastered panels, and stained-glass windows. Cost when complete, about $22,000. The building is now finished except the spire, which will be built during the present year.

SKETCHES IN NORMANDY, FRANCE. MR. E. K. ROSSITER, ARCHITECT, NEW YORK, N. Y.

CORRESPONDENCE.

DE FABRIS'S NEW FAÇADE OF STA. MARIA DEL FIORE.

Florence, January 21, 1880.

The controversy concerning the new façade of Sta. Maria del Fiore is a wide one, but we will summarize it as briefly as possible.

Signor de Fabris's design consists of a three-gabled front similar to that of the Cathedral of Siena, and of the world-famous Duomo of Orvieto. This design has been so furiously attacked that even now, when one fifth of the new façade is completed, the question of its final form still remains an open one.

The admirers of Signor de Fabris's design justify it primarily on the grounds that the Duomo was begun by Arnolfo; that in Arnolfo's time the three-gabled façade was a favorite form of architecture, and that Arnolfo must consequently have intended to adopt it. And in support of this assumption, and on the authority of Vasari, they exultingly point to the frescoes of Simone Memmi in the Spanish Chapel of Sta. Maria Novella. There, they say, may be seen a small picture of the Duomo of Florence, copied by Memmi's own hand from Arnolfo's design. And that picture represents a gabled front.

Besides these historical and archæological reasons, Signor de Fabris advances technical arguments of a more serious value still. He maintains that the façade of a building should be, as it were, the organic outcome of its internal structure, — the flower of its growth. The interior of Sta. Maria del Fiore is Gothic, he says: *ergo*, its façade must be Gothic. Further he contends that the basilical front, being of pagan and profane origin, is in no way adapted to the religious architecture of a Christian people. For the early basilicas were copied from the halls annexed to Roman forums, many of which were even transformed without more ado into churches. Round arches and cupolas being added later there gradually arose the architecture known as Romanesque, and this was fated in its turn to give place to the Gothic. Now Gothic architecture, being a thing *per se*, the product of mediævalism and the child of Christian thought, has no more to do with basilicas than the palm-branch of a saint with the thunder-bolts of Jupiter. And the Duomo of Florence, having been commenced only in the year 1294, when pagan influences had wholly died away, should be consistent with the character of its epoch, — and that epoch was Gothic.

So far Signor de Fabris, whose arguments it will be seen are not unanswerable; and they have been abundantly answered. On the side of the Basilicans is Signor Mospignotti, and he is a most redoubtable champion. With a bristling bayonet line of facts and dates and figures, with a two-edged sword of scorn and ire, he wages war upon the Gothicists, and if he does not altogether overcome them leaves them very prettily wounded indeed. In a pamphlet of 160 pages he attacks first Signor de Fabris's reasons and then his design. He proves (what is, alas! very often and very easily proved nowadays) that Vasari — the dear old gossip! — where facts are concerned is but a broken reed. The story of Simone Memmi's picture of the Duomo is not worth the breath which has been wasted in repeating it. For the Spanish Chapel of Sta. Maria Novella, in which are the frescoes attributed (by Vasari) to Simone Memmi, was only begun in 1350, while Memmi had left Italy forever and gone to Avignon in 1339. So gross an error as this on the part of Vasari leaves one free to suppose that the whole of his story is false, and that consequently the so-called picture of the Duomo does not represent the Duomo at all. And in support of this hypothesis are many technical defects in the said picture which render it highly probable that it was no genuine design of Arnolfo or of anybody else, but simply an imperfect fancy sketch, introduced for the sake of telling a story.

As to the three-gabled façade being in vogue in the days of Arnolfo, that also is an assertion which needs some additional proof; for there are but two façades of the kind in Italy, that, namely, of the Duomo of Orvieto, and that of the Cathedral of Siena. The Duomo of Orvieto was designed by Lorenzo del Maitano, who may be regarded as the inventor of three-gabled fronts in Italy. Before his time there were none, and he began his work only in 1305. Now Arnolfo died in 1310, and four months after his death the façade of the Cathedral of Orvieto was not yet commenced. The Duomo of Siena was designed and begun in 1377 by Bonfredi, who was so pleased with Maitano's idea that he copied it as closely as possible; but he was the master's one disciple, and left no followers. Now Signor Mospignotti contends that if one swallow does not make a summer, neither do two three-gabled façades constitute a national type of architecture. Arguments drawn from the architectural developments of other countries are useless for Italy, which, while it slept the sleep of mediævalism, saw but few of its visions and dreamt little of its dreams. The spell laid upon it by pagan traditions was never fairly broken. Corrupt Byzantine and Romanesque canons guided all its earlier artistic effort. If, even in France, churches which form a link between Romanesque and the Gothic are frequent, how much greater and more marked is the jumble in Italy! There the pure Gothic architecture never bore good fruit. Such growth as it had was transformed when not distorted. In Italy all the most celebrated churches, except the two already mentioned, have basilical fronts, and this is as true of those belonging to the original epoch as of all the others.

Moreover, the three-gabled façade is looked upon askance even by the devotees of Gothicism. It is regarded more as the changeling than the child of its day. Lorenzo del Maitano succeeded, indeed, in making the façade of the Duomo of Orvieto beautiful, but that was by dint of introducing every element which Signor de Fabris's design lacks.

In constructing a three-gabled façade two cardinal principles must always be observed. One is the predominance of vertical over horizontal lines. The other is the disposition of such horizontals as there are in the way best adapted to repose the eye, and to give a

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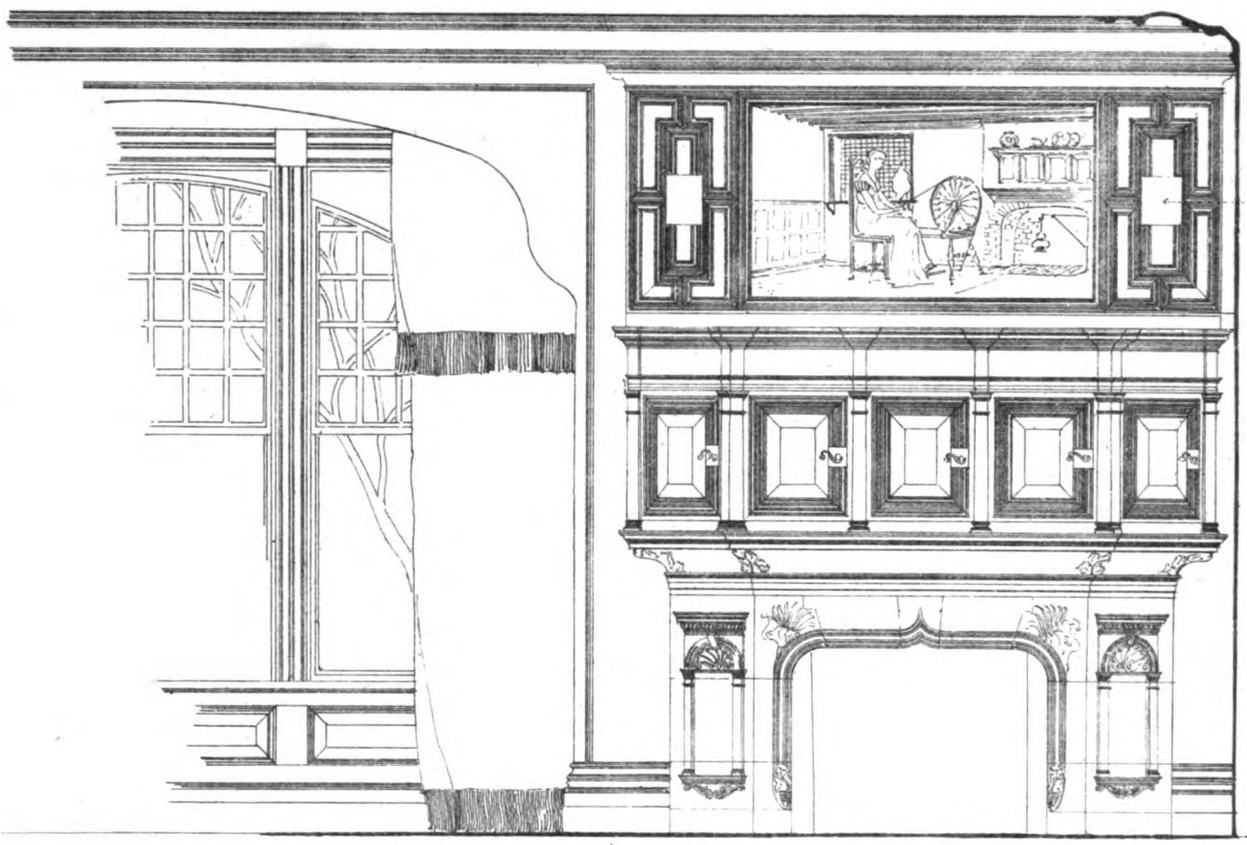
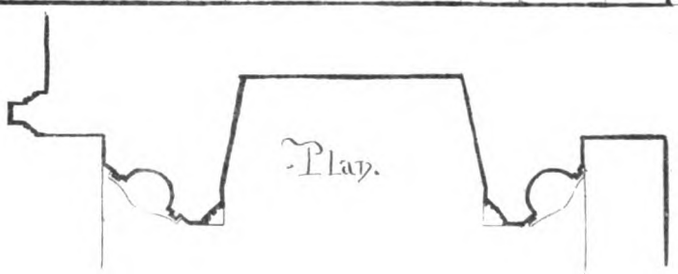


RECESS

EDWARD STANWOOD ESQRE
C. S. LYCE ARCH'T.

SITTING ROOM.



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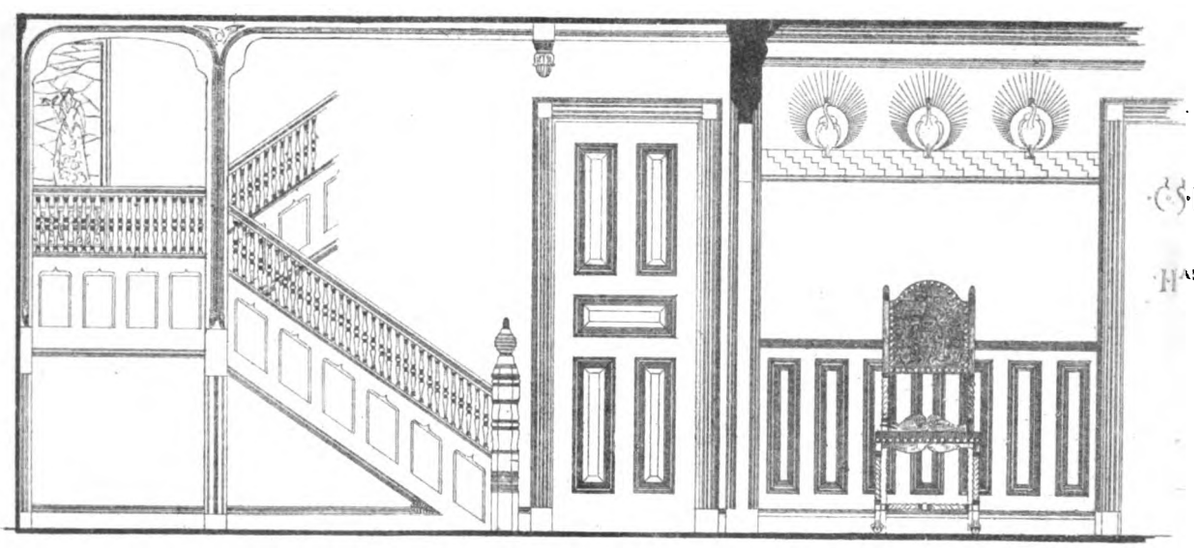

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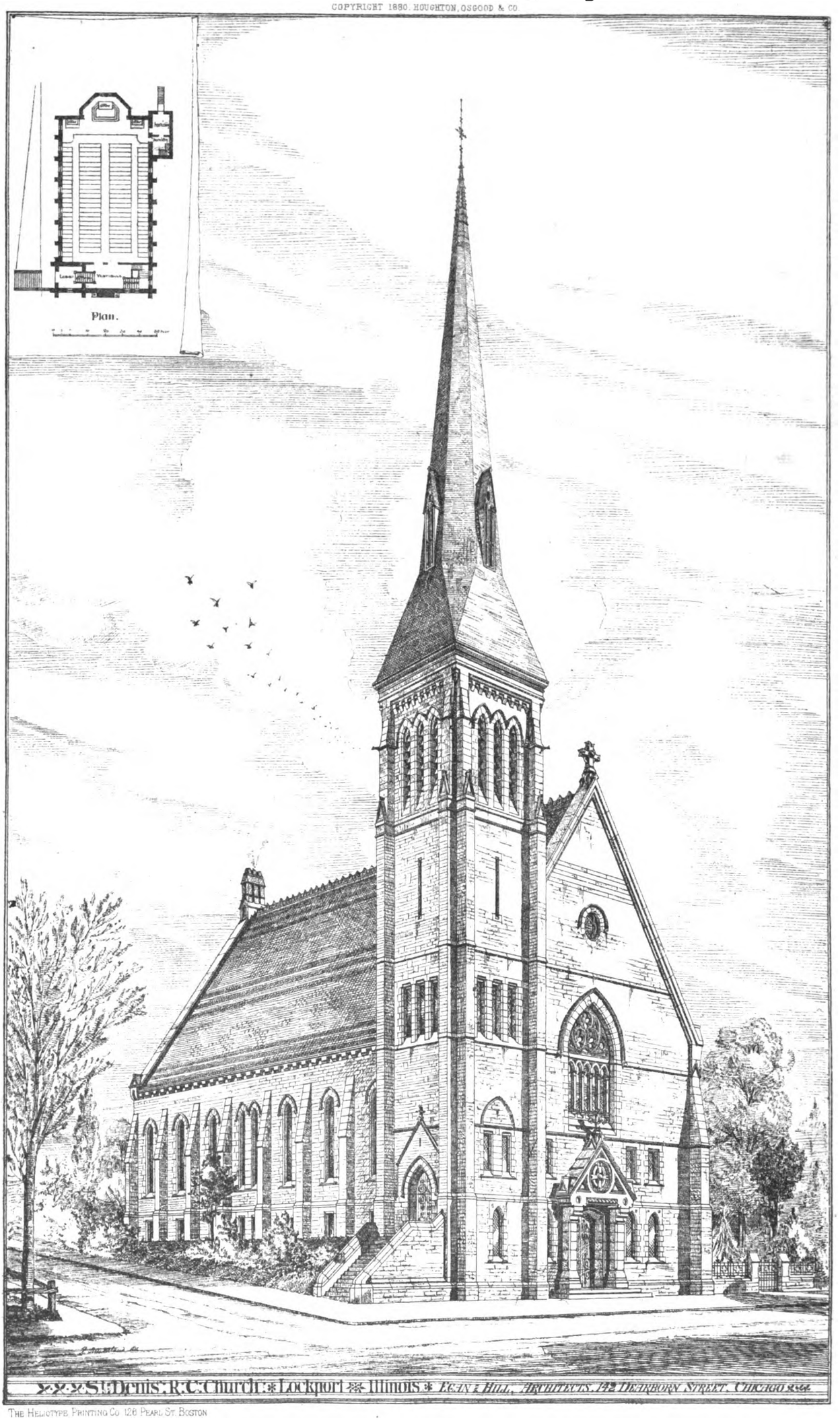

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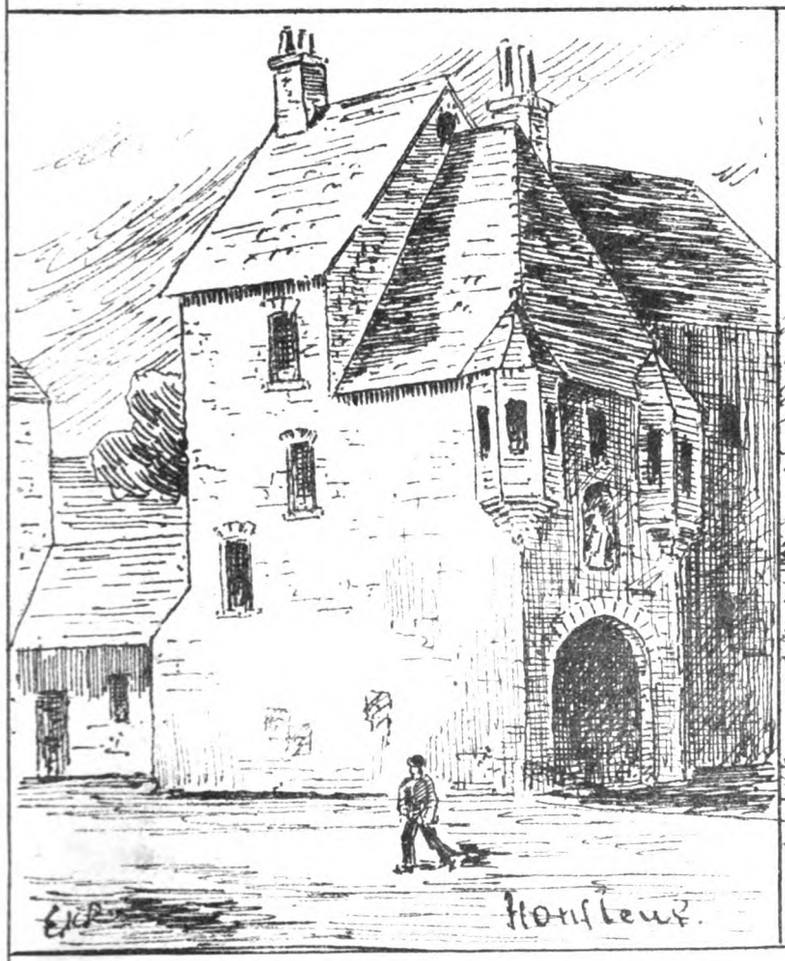

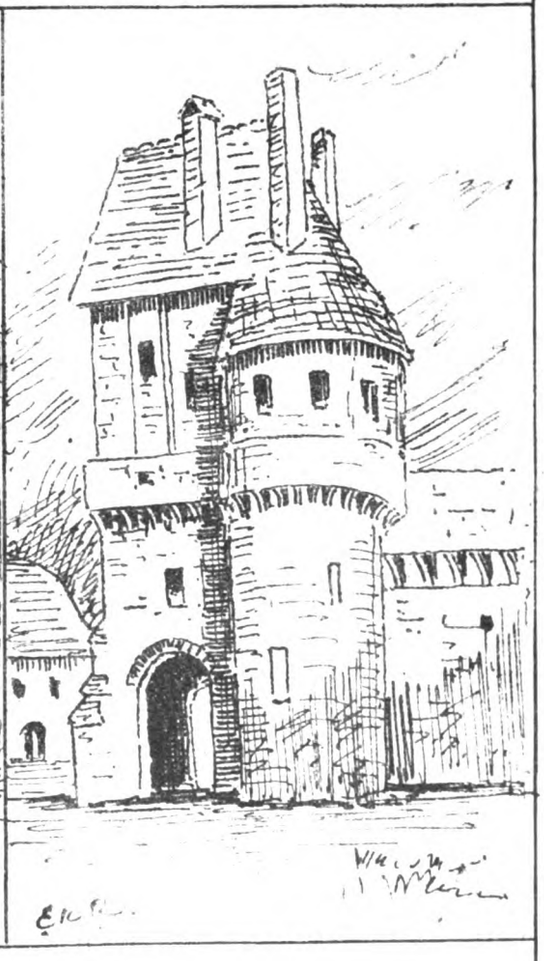

SKETCHES IN NORMANDY
by E.K. Rossiter.

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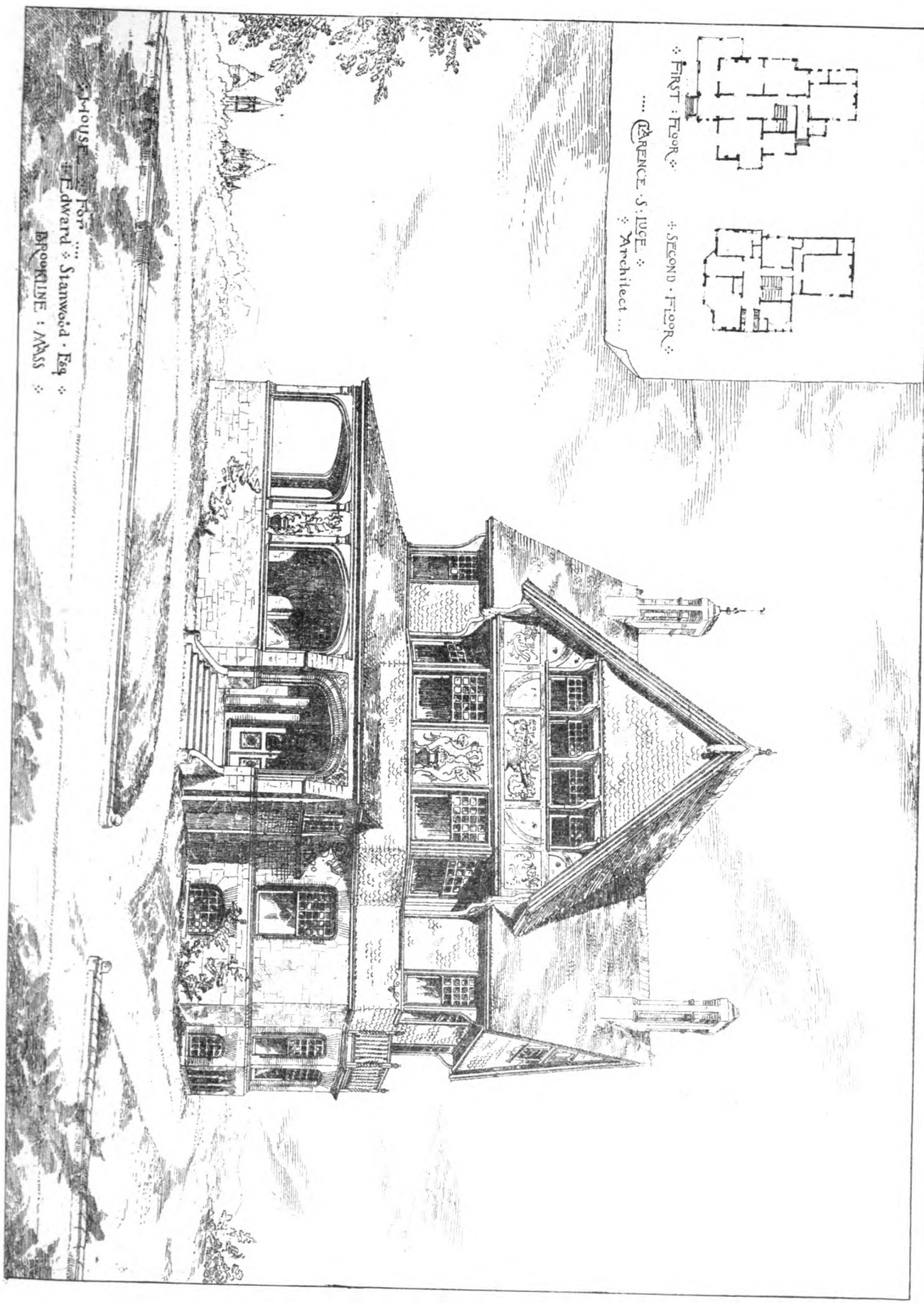

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due sense of stability. The three-gabled façade consists of two systems of triangles, the upper and the lower, or those which surmount the church, and those which surmount the doors. The three upper triangles should assume a pyramidal direction, and this is effected by giving to the central and larger triangle a different base from that of the side ones. But the three triangles above the doors should have a common base; thus conferring upon the lower and stronger portion of the façade the necessary horizontality and balancing the aspirant tendencies of the architecture above. Lorenzo del Maitano so fully understood this that he raised the massive buttresses of the doors to a common height and caused all three arches to spring from one line, thus obtaining for the whole structure the utmost possible harmony of strength. Besides this, by prolonging the sides of the lesser upper triangles, he caused them in reality to begin at the line of the gallery, running along the middle of the façade, and thus conferred greater apparent height and breadth upon the central part. Guided by a still finer artistic instinct he also gave to the side pilasters and pinnacles a breadth double that of those flanking the middle gable, thus causing the façade to appear a corporate portion of the building and not a mere decorative crust.

Finally he made the central triangle the double and one twentieth in width of those beside it, and these proportions seemed so good to Bonfredi that he reproduced them later in the façade of the Duomo of Siena.

Accepting Maitano's façade as beautiful, we proceed to ask, In what way has De Fabris departed from it? The ratio between his middle gable and the side ones is as nine to five. These proportions, which are, of course, imposed upon the architect by the internal structure of the cathedral, cause the central portion of the façade to appear far too crowded and narrow, and constitute a defect that may be described as organic, and should be fatal to the design.

Next, far from the unity of structure so grandly conceived and successfully carried out at Orvieto, the façade of Signor de Fabris is divided into three distinct parts by the two square buttresses running up it, panelled in stories and crowned with a corbelled cornice and a balustrade. The doors are separate tabernacle fronts, flanked by low pilasters bearing insignificant pinnacles, and surmounted by gables which repeat the pyramidal arrangement of the upper parts. Over each door is a rose-window which, existing since Ghiberti's time, had necessarily to be incorporated into the design. But these rose-windows condemn the portions above them to a giddy elevation from whence the middle gable feebly tapers away into space. Fifteen metres of it, when completed, must necessarily tower above the actual roof. The result of this will be that from certain points of the narrow piazza the dome — Brunelleschi's dome, so dear to the Florentines! — will be invisible. Furthermore, the Campanile will be dwarfed to the extent of appearing from some aspects even lower than the façade. And where, asks Signor Mospignotti, is the sense of a bell-tower if it does not rise high above every other portion of the church? And where on the face of the globe do you find a three-gabled front with a lofty tower just beside it? Not at Orvieto, not at Siena, and, excluding these, to what other standards can Italian architects appeal?

In conclusion, Signor Mospignotti and those who think like him hold that a three-gabled façade, even when beautiful beyond the dreams of a De Fabris, is an invention opposed by its essential nature to the architecture of the Duomo. For the lines of that monument have fallen in horizontal places, and its numerous cornices and countless bands of colored marbles clamor for a façade from whose severe basilical majesty all trace of a superfluous point shall be banished! M.

EDWARD MIDDLETON BARRY, R. A.

It is with deep regret we have to record one of the heaviest losses which the profession of architecture has experienced for many years. By the sudden and quite unexpected death of Mr. Edward Barry, in the prime of life, we lose an architect who occupied the highest personal and professional position; in whom taste, judgment, talent, and ability were all equally conspicuous; and whose friends might reasonably have anticipated for him a course of prosperity and activity prolonged through many years. In more than one respect the calamity which has cut short so fine a career thus suddenly recalls the no less unexpected decease of his friend Mr. F. P. Cockerell. Each was the inheritor of a great name; each worthily bore the hereditary honors that had fallen upon him; each was devoted to the practice of Classic or Renaissance rather than Gothic art; each enjoyed the advantages of good social position; both were conspicuous for charms of manner and a gift of conversation such as could hardly fail to make their mark in any circle; and both were carried off by an early death at a moment's notice. Barry was, however, the older man, and had attained higher professional successes than his younger friend and rival had had time to reach, or would perhaps ever have arrived at; and there can be no hesitation in saying that the shock which has deprived the Royal Academy of its Professor of Architecture and Treasurer, has at the same time robbed that section of the art world which pursued Renaissance art and architecture of its foremost architect.

Edward Middleton Barry was the son of Sir Charles Barry, and received his professional education partly in the office of Mr. Thomas Henry Wyatt, and partly in his father's office. He ultimately became a kind of chief assistant to Sir Charles after Mr. Banks, who had long held that position, had started in practice on his own account, in partnership with Mr. Charles Barry. The various works in hand at the time of Sir Charles Barry's death in May, 1860, were completed under the superintendence of the subject of this memoir. The most important of these was the Palace of Westminster, in connection with which numerous matters remained to be finished, though, as may be remembered, the flagstaff on the Victoria Tower had been fixed just in time for the flag to be hoisted half-mast high on the day of the funeral in Westminster Abbey. Mr. Barry received the appointment of architect to the building at Westminster in succession to his father, and was proud to hold it, and glad to devote to the maintenance and perfecting of this great work much of his time and powers. Ultimately, however, Mr. Ayrton thought fit to abolish the appointment; and although a deputation from the Institute of Architects, which included almost all the prominent members of the profession, waited upon Mr. Gladstone, and through Sir Digby Wyatt and others remonstrated against the undeserved slight thus put upon an architect of unblemished reputation, and deprecated the policy which would leave the professional care of our foremost public building to the judgment of a mere clerk of works, cheese-paring policy held its own. Mr. Ayrton's desire to humiliate a profession, against which he seemed to have conceived a special spite, was not to be baulked, and Mr. Barry, to his no small mortification, found that the post which he had filled was to be regarded as permanently abolished.

A provincial work of great beauty and power, which was only partly built when Sir Charles Barry died, was completed by his son. We allude to the Halifax Town-Hall. The lower portion of this building is remarkable for the grace of its proportions and the fine Italian character of its details, and is but little different from the best work of Vignola or Palladio. A tower, however, was carried up, and Sir Charles's sketches for the completion of it showed that he had intended to terminate it by the addition of some sort of high roof. This was worked out by Edward Barry, and a little more Gothic feeling was infused into it than perhaps his father would have attempted; but the whole was accomplished with much vigor and cleverness. It was the precursor of not a few pointed roofs attached to designs of Renaissance character which its author at various times prepared, and some of which he carried out. We may also refer to the Halifax tower as having furnished a precedent, if not a model, for a very similar feature introduced by Mr. Robson into the Municipal Buildings at Liverpool.

After this beginning Mr. Barry was successful in securing a considerable practice, much of which consisted in public or semi-public buildings, so that he early became prominent. He, for example, rebuilt for Mr. Gye the Covent Garden Opera-House, after it had been destroyed by fire — a work remarkable for the speed with which it was carried out, the solidity of its construction, and the general convenience of all its arrangements. As a work of art, we cannot place this building high. The *porte cochère*, which is formed by a simple bold portico with a pediment, is the one feature that redeems the exterior from complete and uninteresting heaviness. Both vigor and skill are, however, shown in the use made of this hackneyed expedient. Internally the house is as little original as it could well be; but for this Mr. Barry is not altogether to blame. His client was not to be induced to accept improvements or variations; and the somewhat commonplace interior which has become so familiar to the London public is more a monument to Mr. Gye's determination than an embodiment of Mr. Barry's designs. Happier as an architectural work, and far more fortunate in its materials, its site, and its surroundings, the Opera-House at Malta, which Barry designed and erected, may fairly claim to be one of the most effective theatres in Europe, and probably the most successful Italian design which its architect ever carried out.

For the Southeastern Railway Company, Mr. Barry designed and erected the two terminal stations and hotels at Cannon Street and Charing Cross. Both these buildings are executed in brick and cement, and are florid designs of rather nondescript Renaissance character, with towers and high-pitched roofs. The Cannon Street building is a little the more severe and correct of the two, and probably the less successful. It, however, contains a very telling and well decorated public hall of large size. There is every excuse for an architect who is treating a comparatively untried subject if he attempt a somewhat novel combination; and high-pitched roofs, not of French Renaissance but of decided Gothic character, combined with windows, balconies, and other features which possess not a trace of Gothic, form unquestionably a novel and picturesque, and perhaps an excusable combination.

In the open space in front of the Charing Cross Hotel, Mr. Barry executed a very careful archæological work, which has hardly been appreciated as it deserves. We allude to his reproduction of the old Cross of Charing, which stands in the station yard, strangely out of harmony with the cabs and carriages by which it is surrounded, and too much concealed from view by the close railings enclosing the whole space to be readily noticed by the casual passer-by. This is as careful a restoration as a very painstaking collation of existing prints and views, and a personal examination of the remaining Eleanor Crosses, could make it. The late Mr. Arthur Ashpitel

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assisted *con amore* in the search for precedents, and undoubtedly the result was as good a restoration of a monument, every fragment of which had disappeared, as can anywhere be met with.

It may be here convenient to allude to some of the other works of Gothic character which Mr. Barry carried out. The conspicuous group of school buildings in Endell Street, which seems to gain rather than to lose by time, is one which, from the fine accentuation of its principal masses, and the vigorous handling of the main arcade, will always strike the eye as a powerful design and the work of a true artist. Mr. Barry also built for the Leeds Grammar School a Perpendicular school-house, and was architect of various other scholastic buildings of the same class. He, in addition, carried out some excellent Gothic decorative work in the Queen's Robing Room at the House of Lords, and in the interior of St. Stephen's Chapel. The genuine bent of his personal tastes lay, however, in another direction; and though none of his Gothic works can be accused of being inaccurate, the Endell Street school building is the only one personally known to us in which Edward Barry has handled Gothic architecture with the skill of a master. As his practice advanced, his mind seemed to grow more and more out of harmony with everything Gothic, so much so, indeed, that in his greatest competitive effort, his design for the Law Courts, the artistic value of what he proposed was, to tell the truth, painfully low.

The competition for the Law Courts was the occasion of a disappointment which was keenly felt by Mr. Barry. His design was placed foremost by the judges for planning and contrivance, and he was recommended as joint architect with Mr. Street. The ultimate decision in favor of that gentleman as sole architect, which was arrived at by the Government, was not compensated for by Mr. Barry's success in the competition for a new National Gallery, which took place about the same time. In this case, working in the style of Italian Renaissance, in which he was thoroughly at home, he had fairly distanced all his competitors by the art as well as the skill of his project; and he was naturally unable to comprehend that his having fairly won one public competition should be made an excuse for depriving him of his share in the expected fruits of another. The National Gallery design, as our readers know, has only been to a certain extent carried out. The recent enlargement is, it is true, the embodiment of a portion of Mr. Barry's plan, and, as far as it goes, is undoubtedly successful; but none of the important architectural features of the exterior or of the interior have even yet been executed, and Barry has died, as many other eminent architects have before him, with the plans of his *chef-d'œuvre* still in his portfolio.

Much of Mr. Barry's private practice consisted in the erection of mansions, and he early perceived the admirable suitability of the Transitional Renaissance style of France in the time of Francis I. to this purpose. No style that has ever been employed in Europe will lend itself so well as this to the purposes of the builder of noblemen's houses; but it requires the hand of a consummate artist to employ it as happily as did the designers of Chambord and Chenonceaux, Blois or St. Germains. We doubt whether Barry, true artist though he undoubtedly was, really brought to bear upon his use of this charming style as much delicacy of feeling and self-restraint as are requisite in order to render it perfectly successful. The latest and most conspicuous example of his employment of it — the large block of chambers recently erected in the Temple Gardens, looking on to the Thames Embankment — will illustrate our meaning. Here the ornament is too profuse and too large in scale; its effect is consequently obtrusive, and the eye resents its interference with the features of the building. If this design be contrasted with St. Stephen's Club-house, built at the extreme west end of the same embankment, by the present president of the Institute, the effect of a very close conformity to the best precedents will be seen to be superior to that of a perhaps more original but less harmonious treatment of the style. We ought, however, after all to be too grateful to Mr. Barry for the way in which he has contributed to render so charming a phase of architectural design familiar to English taste to quarrel much with his having handled it in a manner of his own.

Elizabethan, perhaps the most thoroughly English style available for modern domestic purposes, was familiar to Edward Barry, and in Crewe Hall, where he executed very large works of restoration and addition, we find it wonderfully well handled and with undoubted success.

Barry was elected a Royal Academician in 1869, having been chosen an Associate soon after the completion of the Covent Garden Opera-House. He succeeded Mr. Sydney Smirke in the position of Treasurer to the Royal Academy, and Sir Gilbert Scott in that of Professor of Architecture. In this capacity he has delivered courses of lectures marked by great learning, highly cultivated taste, and vigorous original thought. Singular to relate, his untimely death leaves the winter course of the present session incomplete, his last lecture, delivered on Thursday, January 22, being only the third of his course. Mr. Barry was a Fellow of the Institute of Architects and one of its vice-presidents, and had received the gold medal. He was a Foreign Honorary Member of the Royal Academy of Arts at Vienna, and enjoyed other distinctions.

Mr. Barry's name was rarely absent from the list of exhibitors in the Architectural Room of the Royal Academy, and most of his best works were illustrated on its walls by powerful colored drawings. He contributed a large number of fine works to the Architectural Room of the late Paris Universal Exhibition, where he obtained a medal. By these exhibitions the characteristics of his manner when working on buildings for private clients must be as well known to many of our readers as the peculiarities of the public buildings with which he has enriched London.

Edward Barry was original, energetic, decided in his handling of the masses and features of his work, fond of ornament and somewhat reckless in his use of it, but full of true artistic feeling, and profoundly learned in his own and in the sister arts. His personal character was one that commanded respect and invited confidence. Thoughtful and deliberate in manner, thorough in method, fertile in resource, painstaking and yet bold, he united many of the best qualities that an architect should possess. He attracted those who knew him intimately by a fund of varied information, an unflagging brightness and kindliness of disposition, and an unequalled brilliancy in conversation. The best of companions, his large range of knowledge and experience, and the force of his powerful intellect and determined will, were graced, but not concealed, by a constant flow of clear illustration and brilliant wit, not unmixed at times with hearty fun — all which it is indeed sad to think will be heard no more by that large circle of friends among whom his society was prized. — *The Architect.*

AN OLD T-SQUARE'S VIEWS ON VENTILATION.

Good ventilation, like washing one's self, is a matter of personal attention. In these days of machinery and automatic contrivances we dream of a system of ventilation that will carry itself on and regulate itself, and, without any attention from us, attend to the whole matter. So slovens would be willing to go clean, if they could be kept so with no effort of their own, and without knowing how the thing was done, or, in short, anything about it. Unfortunately for our lazy and indulgent selves, "eternal vigilance is the price" of good ventilation, — as much the price of freedom from impurity of atmosphere as of any other kind of freedom. We are too slavish to value any kind of freedom much, this among the number.

But did we value freedom from impurity of atmosphere enough to choose to give attention to the matter, and cultivate a cleanly *habit*, we have at hand a most effective contrivance with which to carry it out, and to secure what, compared with what is common, must be called good ventilation. Open *all* the windows, *as soon* as the congregation, company, or individuals leave the room, and keep them wide open five or ten or fifteen minutes, according to the size of the place and the number of those leaving it. This is nothing constant or automatic, any more than washing one's face is constant or automatic, but it is cleansing — it is cleansing.

Note: To open all the windows of a room as soon as it is emptied of the company, and so further empty it of other organisms, etc., and to keep these windows open thereafter, is to waste the heat of the house? Yes, just as washing one's face is to waste water and towels. Only the cost of furnishing water and clean towels is something calculable, and so appreciable. The added cost in fuel, if the rooms of a house are aired a few minutes every time the company leaves them, is inappreciable.

But even if it were appreciable in amount, and the cost of it calculable, yet the heat which passes off when windows are open to ventilate a house is *used*, not wasted. When the temperature is different indoors and out, the heat indoors is the power which sets in motion the currents which carry off the vitiated air and create the vacuum which is supplied by fresh air. It is heat well spent, though not to warm our bodies. Like the heat spent, not to warm our bodies, but to cook food for our stomachs, it is not wasted, but used, and well used. P.

THE LIGHTING OF PULPITS.

In the lighting of churches the problem of how properly to light the pulpit is a very serious one, and has been considered over and over again, with only partial success. The requirements are that it shall be arranged to use either in night or daytime, and efficiently light the rector's manuscript, while at the same time it shall not incommode the rector himself, or his congregation, and in general appearance shall be artistic and in harmony with the architecture and purpose of the building itself. The low reflector lights often used in front of the desk, while not seen by the congregation, throw a very uncomfortable glare and heat on the rector's face, and endanger his manuscript. The side light, with black opaque globe, also used for this purpose, while giving a good light to the preacher, has nothing else to recommend it, being exceedingly commonplace, and positively ugly. They are also very much in the way, and inadvertent gesticulation of the speaker often produces serious consequences. The question has been met in an admirable way at St. James's Protestant Episcopal Church, in this city, whose elaborate memorial pulpit, lately erected by Mr. John Struthers, has been recently noticed. The lamp, invented and designed by Mr. Joseph M. Wilson, is hung over the pulpit, leaving the whole area perfectly free and undisturbed, and placing the source of light in the most natural position for comfort to the speaker's eyes and for the illumination of his manuscript. To protect the congregation the light is surrounded by an opaque screen, which is made sufficiently low even for the pews directly under the pulpit. This is accomplished by reducing the lowest opening to a diameter of only six inches, just large enough for

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a circle of light on the desk of the pulpit; and in order not to allow this to diminish the quantity of light on this area, but rather to increase it, the screen or covering has been made in shape an ellipsoid, scientifically and mathematically worked to the proper form, so that the light itself being placed in the upper focus, the rays are concentrated by reflection on to the lower focus, and through it to the desk below, throwing a brilliant light just where required. The interior of the upper half of the ellipsoid is highly polished, while the lower half is blackened to absorb all rays which would be disagreeable to the congregation. The whole is made of polished and chased brass, very beautifully worked up, and entirely appropriate to its position. — *Philadelphia Ledger.*

THE DURABILITY OF GUTTA-PERCHA.

IN his lectures before the Society of Arts on the recent advances in telegraphy, Mr. W. H. Preece, the electrician to the British Post-Office Department, pointed out some of the curious accidents to which gutta-percha-covered wires were liable: "Gutta-percha-covered wires," he said, "would be very well if they would last. But, unfortunately, gutta-percha is a gum that only appears to last when in water. In water it apparently is indestructible. Cables that were laid in 1851, and have been brought up within a recent date, are now as good as the day when first put down. But when gutta-percha becomes exposed to the air, to the alternations of climate, especially when exposed to the action of the sun, it decays very rapidly; it oxidizes, and becomes a kind of resin that can easily be crumbled into a snuff-like substance. Many attempts have been made to protect it and to arrest this rapid decay. It has been surrounded by tape soaked with tar. Tar itself has been found to be injurious, and has been supplanted by other materials, but at the present moment we have not yet succeeded in finding anything that renders gutta-percha indestructible. In fact, when exposed to air, as when suspended in tunnels, it seems to have a life of about ten years; when laid down in our iron pipes, under the influence of the variations of temperature and moisture that exist there, it seems to last about twenty years; but in the sea, where it is exposed to equable temperature and equal condition, it apparently seems capable of lasting forever. There are many curious accidents and causes of interruption to working that we meet with in our gutta-percha-covered wires, and one of the strangest is one of the last that we have discovered. We have found in many places that this gutta-percha is apparently gradually eaten away. It seems to go not unlike the way in which open-air wires rust away; and this curious action only occurs in certain places. In certain parts of the country, North Wales, Dublin, Kent, and in one part and another, we have found this curious action going on; and careful examination and inspection under the microscope have led us unmistakably to conclude that it is due to something or other eating away the gutta-percha. Curiously enough, wherever we have detected this action taking place, there also we have found swarms of a very minute insect, a very little thing, belonging to what is called the spring-tail tribe. It is a little white fellow that you can scarcely see, and when you do see him he seems conscious of the fact, for he immediately disappears with a spring. It is the *Templetonia crystallina.* It abounds in swarms in certain soils, and seems to have a great liking for gutta-percha. It does not remain near the wire when it has eaten its way through, but, apparently, immediately retires when it touches the wire, as though it had received a shock, and makes a sudden retreat. It is a curious fact, and until recently it was unknown that any living creature had a taste for gutta-percha."

THE TIDES AS A MOTIVE POWER.

A SUGGESTIVE paper was recently read before the Liverpool Engineering Society on "The Utilization of the Tides," by Mr. Oates, of Bradford. Mr. Oates was of opinion that although the coal supply of England would last for a long time to come, yet that ultimately the power of the tides would outrival all other sources of mechanical power. The ways of taking advantage of the power of the tides he divided into two comprehensive classes — one requiring large permanent construction, such as the various modifications of the tidal dam; this he considered the most efficient and economical for using the vertical motion of the tide, which motion is the most important for mechanical purposes. The other class was the numerous, but comparatively unimportant, utilizers, which do not require such works, such as the tidal cask, but which would only be employed when the power is required intermittently. The former could only be undertaken by large public bodies, but the latter might be employed by small capitalists. He then suggested how the horizontal motion of the tides might be taken advantage of by water-wheels, etc. After pointing out that the ways of utilizing the tides were innumerable, and describing the construction of the tidal dam with suitable converters of the power, such as turbines, in openings of the dam, working air-compressing or magneto-electric machines, he stated that the necessity for large conservators for storing the power between the tides would be the greatest difficulty in utilizing their power. A brief description of how this could be done, and the power rendered constant, was given. The means of conveying the power to a distance was then considered, air and water pressure and electricity being suggested. With regard to the latter, Mr. Oates believed that the "age of steam" had reached its zenith, and that the "age of electricity" had dawned; but should there be difficulty in conveying the power to a distance, he suggested that manufacturing towns might be built adjacent to suitable sites for utilizing the tides.

THE LIVERPOOL CORPORATION TEST FOR CEMENT.

BOSTON, February 18, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — In answer to your correspondent's postal card which you send me I would refer you to the following: The Science and Art of the Manufacture of Portland Cement, by Henry Reid, C. E. (London: Spon, 1877), page 316, — Liverpool Corporation Test, the specification of which is as follows: "Samples of pure cement will be gauged with water, and placed in the brass mould used by the corporation, within twenty-four hours: the casts thus made will be immersed in still water in which they will remain until the expiration of the seven days from date of moulding, when they will be taken out of water and tested to ascertain their tensile strength, which must not be less than eight hundred pounds on the sectional area of 2¼ square inches." Mr. Deacon, engineer of the corporation, says, "The actual strength of the cement obtained during the last year [about 1876, probably], under this specification, has averaged 871 pounds."

If I am wrong in my conclusion that 355 pounds per square inch is the Liverpool Corporation test, or my authority is not a proper one, I should be glad to be notified of the fact.

Respectfully, ERNEST W. BOWDITCH.

PUBLICATIONS RECEIVED.

CIRCULARS OF INFORMATION OF THE BUREAU OF EDUCATION. Nos. 1, 2, 3, 4, and 5. Government Printing Office. 1879.

NOTES AND CLIPPINGS.

THE NEW YORK UNDERWRITERS, AND THE OLD RESERVOIR. — The New York Board of Fire Underwriters has sent to the State Legislature resolutions protesting against the removal of the Murray Hill reservoir. It is asserted by the Board to be unsafe to dispense with any provisions for the safety of that city from sweeping conflagrations, in view of the fact that the annual consumption of water is nearly equal to the capacity of the aqueducts, and that the supply is liable at any time to be lessened by the manner in which most of the original aqueduct was constructed. The Board therefore opposes the removal of the reservoir and also the appointment of the proposed commission.

MOIST AIR NOT HEALTHFUL IN DWELLINGS. — The theory is now ingeniously maintained by Professor Briggs that the summer condition of temperature, 62° to 68°, and relative humidity, 80 to 85 per cent, is not desirable or even attainable, at other seasons, in the heating of dwellings. His argument is, that the dry air of America possesses both curative and preventive qualities, of great value, and that moist air, which promotes vegetable growth, is, on sanitary grounds, not desirable for breathing. He states that the dew point is far below the freezing point of water in well warmed and ventilated rooms, where there is nothing of that sensation of dryness which is usually held to accompany the heat of a furnace, when not supplied with water for evaporation. Again, new houses, that are accounted unhealthy in Europe, are not so in America, and gas burned in rooms produces much less unpleasant effects in America than in England; what is needed is an equality in relative humidity between the interior and exterior air; thus if the outer temperature be 0°, and relative humidity 40 per cent, and the interior temperature be 70°, the interior humidity ought to be raised to 70 per cent, by adding a little water.

NON-INFLAMMABLE WOOD. — At a meeting of the British Association recently held at Sheffield, Col. P. P. De la Sala exhibited non-inflammable wood for building purposes, also wood shavings, non-inflammable, for the manufacture of mats, rope, etc. The inventor thus explains his peculiar method, which is already patented: —

"Though all alkaline compounds reveal the property of rendering vegetable matter more or less pliable and non-inflammable, I preferably make use of carbonates of fixed alkalies in the following way: I dissolve in cold or warm clear water carbonates of potash or soda, or I make use of them in a solution of filtered water heated to the boiling point, and add hydrate of lime to this solution, graduating the strength so as not to exceed a specific gravity of 1.060 if potash is used, or 1.050 when soda is used. In the first case, the strength of the solution corresponds to about 30 grains of hydrate of potash to the fluid ounce, or about 20 grains of hydrate of soda to the fluid ounce. Wood to be used in naval construction, and in buildings or structures of wood on land, as well as vessels and land buildings already constructed, can be rendered fire-proof by saturating the floors and decks, and all exposed wood-work, with alkaline lyes, and when dry, the wood may be whitewashed, painted, or varnished in the usual way. For boards, planks, or thicker pieces of timber, I graduate the time of immersion so as to form a coating of from one sixteenth to one eighth of an inch, which can be obtained in from four to twelve hours, according to the more or less porous nature of the wood, or the compactness of its fibre. I consider a coating of about one eighth inch deep to be a sufficient fire protection for all kinds of timber for building purposes, as the spread of fire and great conflagrations generally originate in relatively small causes, such as burning cinders, dropped sparks from fireplaces, matches accidentally ignited, inflamed liquids, candles left burning, etc.; but the fire-proof coating can be made deeper, or even to go through the whole timber, in the event of its being considered desirable to combine great flexibility with absolute non-inflammability. In this case I make use of hydraulic or other pressure, so as to force the alkaline lyes through the wood to the extent desired."

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The Fire Laws of Japan. — The severity with which persons in Japan are punished who have the misfortune to be burned out is stated as follows: If the house is unoccupied and is accidentally set on fire, the person through whose carelessness the fire is started receives ten days' imprisonment with hard labor; if it is inhabited and the fire be produced by the proprietor, then he is punished with twenty days; if the fire spreads to other houses the sentence is forty days, and when anybody is killed thereby, one degree heavier; but if the person killed is a relative of the first degree, the punishment is one hundred days; if the house belongs to the government, one hundred days; if a temple, from sixty days to one year, but ten years are inflicted if it happens to be one of the great temples of Isle, or in the precincts of the Imperial Palace. If a robber sets fire unintentionally to a house, he is punished with at least three years' imprisonment with hard labor. Decapitation awaits incendiaries, ten years' penal servitude an attempt at arson; the punishment being mitigated if the would-be incendiary is a servant who has just received a sharp rebuke, or if the attempt be made on an uninhabited dwelling. If a man sets fire to his own house, ninety days, but if the fire spreads to houses in the neighborhood, two years and a half; and penal servitude for life is inflicted if the offender profits by the opportunity of the fire to purloin goods or property.

Cost of Ill-Health. — The following is summarized from a paper lately read by Dr. John Watts (a member of the Society of Arts) before the Manchester and Salford Sanitary Association: —

With respect to the extent to which personal and social suffering was accompanied by pecuniary loss, it looked a small matter that a man should miss a few days' work occasionally because he was not quite well; but when we learned that in the Manchester Unity of Odd Fellows alone there was paid in 1878 for sickness the sum of £347,213, or 13*s.* 4*d.* per member, and that that large society only represented about 10 per cent of the heads of families in England and Wales, it was no longer to be called an insignificant affair. The heads of families in England and Wales numbered about 5,111,111, of whom 4,259,259 were working-class families, whose weekly wages would amount to about £5,322,675, or £887,112 per working day. The experience of friendly societies showed an average of sickness varying from 1.94 to 2.45 weeks per annum per member between 21 and 70 years of age. But, we had to include, in our calculation, the less prudent men who were not members of friendly societies, and we might safely assume an average sickness of 2½ working weeks per annum, and then we should find that by loss of work through sickness the working men lost no less than £13,306,687 per annum. If we added to that sum 25 per cent for the losses of employers and dealers, we should find a loss to society, the measure of which was £16,632,359, or £1,108,824 for each day of sickness. Here, then, was our additional motive for work as sanitary reformers; for every day that we could lessen the average sickness of the heads of families of England and Wales we should add to the wealth of the country by more than a million sterling. The heads of families in Manchester and Salford numbered about 111,111, the working-class families being 92,593, whose weekly wages amounted to about £115,741. The average sickness of two and a half weeks would in this case, therefore, cost £289,352, or £19,292 per day. For every day that such sickness could be prevented by public sanitary measures the authorities of Manchester and Salford would add to the wages of working men £19,292. With 25 per cent added for profits of employers and dealers, the gain to society would be £24,115 for every day so saved. And if the sickness of the workers were lessened by public improvements in and about their homes, and by the isolation of cases of infectious diseases, the health of the non-workers would also be improved, and money would be saved if not earned. He urged the importance of those who were principally to gain by the results of sanitary reform being got to take an interest in its progress, and spoke of the advantages of provident dispensaries.

Suspension Bridge over the Forth. — The railway suspension bridge over the Forth at Queensferry will be, when completed, the most remarkable application of the suspension principle in the world. The breadth of the Forth at Queensferry is rather more than a mile; but as the viaduct is to be continued overland on the north shore for several hundred yards, the whole length of the bridge will be about one mile and one third. The capital of the Forth Bridge Railway Company is £1,250,000. The interest on the sum, £75,000 a year, has been guaranteed by four railway companies, the largest share being held by the North British, which will be saved by the new route an annual outlay of £40,000 on account of the ferry traffic between Granton and Burntisland. A formal commencement of the work of construction was made in September last, when the foundation was laid of one of the great towers on the Island of Inchgarvie. When the masonry of that tower had been carried up to high-water mark, the work was suspended in anticipation of the contract for the whole undertaking being accepted and entered on. The explanation was that the bridge could not be finished within less time than six or seven years; but it is stated that it is an express stipulation with the contractors that the completed fabric is to be handed over to the company not later than January 1, 1885. — *London Times.*

Tulare Lake. — Fourteen human skulls, ranged round in a circle, were found on an island in Tulare Lake, California, some time ago. These mysterious reminders of some lost romance were in the middle of the island, a small patel of grass, thick brush, and pigmy cottonwood trees. No other bones could be found near them. Near by, on the shore of the island, were two huts of basket-work, but both were untenanted. Tulare Lake is, probably, one of the most mysterious spots on the continent. It is 300 miles south of San Francisco, in a great plain. As the traveller approaches, the water appears to be higher than the land. The dry land of the plain gives place to damp soil a mile or so before water is reached. When the margin is found at last one may wade out for more than a mile and not get in above the knee. The lake runs forty miles one way, and has a breadth of about thirty miles. The bottom is formed of powdered clam-shells, and there are hundreds of small islands and bunches of tules. Millions of white birds of the gull kind tenant the islands, flock high in the air, or skim the still water. Mounds have been found along the shore, and before many months the whole bottom, it is said, will be inspected, in the belief that it will show traces of a submerged city.

Mr. Ruskin on Public Art Galleries. — Mr. John Ruskin, having been invited by a gallery promotion committee in Leicester to give his opinion as to how a permanent art gallery can best be formed, writes: "What use is there in my telling you what to do? The mob won't let you do it. It is fatally true that no one nowadays can appreciate pictures by the old masters, and that every one can understand Frith's Derby Day. That is to say, everybody is interested in jockeys, harlots, mountebanks, and men about town; but nobody in saints, heroes, kings, or wise men, either from the East or West. What can you do? If your committee is strong enough to carry such a resolution as the appointment of any singly responsible person, any well-informed gentleman of taste in your neighborhood, to buy for the Leicester public just what he would buy for himself, that is to say, himself and his family, children being the really most important part of the untaught public, and to answer simply to all accusation, That is a good and worthy piece of art (past or present, no matter which), make the most and best you can of it, — do so."

Boxwood in Russia. — Boxwood grown in the forests on the shores of the Caspian Sea is, says the *Gardener's Chronicle*, a large article of trade with Russia. This wood reaches Astrachan and Nijni-Novgorod in the spring of the year, where it is sold during the fair. Last year the quantity so sold was about 130,000 poods, being about 80,000 poods in excess of other years. It is pointed out in a recent report that the increased demand for this boxwood, which is used for shuttle-blocks, indicates increased prosperity among Russian manufacturers. On the subject of boxwood, the acting British Consul at Tifflis writes: "*Bonâ fide* Caucasian boxwood may be said to be commercially non-existent, almost every marketable tree having been exported. Such exorbitant terms are demanded by the government for the right of cutting in one or two remaining Abkhasian boxwood forests as virtually to bar their acquisition." He goes on to say that having personally visited these forests he is in a position to assert that their real value has been considerably exaggerated, most of the trees being either hollow or knotted from age, and much of the best wood having been felled by the Abkhasians previous to Russian occupation. The boxwood at present exported from Rostov, and supposed to be Caucasian, comes from the Persian provinces of Mazanderan and Ghilan on the Caspian. What has been said respecting boxwood applies equally to walnut burrs, or "loupes," for which the Caucasus was once famous, 90 per cent of which now come from Persia. The walnut trees of the forest along the Black Sea, which are extraordinarily numerous, and afford excellent material for gunstocks, do not, from some climatic peculiarity, produce burrs, which are only found in the dryer climates of Georgia, Daghistan, Persia, etc. The immense quantity of walnut timber in the forests on the Black Sea is mostly unavailable from the complete absence of roads or means of transport, and the dearness and scarcity of labor.

One Effect of establishing Fire-Limits in Small Towns. — The town of Cohoes, N. Y., is unfortunate in the execution of its new fire-limits law. A manufacturing firm took umbrage at interference with their plans for building a long wooden extension, and are transferring their rolling mills to Albany. The firm already employed 500 men, and disbursed $15,000 monthly among them.

Toughened Glass. — When, almost ten years since, De la Bastie made known to the world his process of annealing glass in oil, the value of his discovery was somewhat overrated. Since then his process has gained a firm foothold in certain branches of glass manufacture, and it is therefore that recent experiments on toughened glass, made by Dr. Schott and published in the *Verhandlungen z. Beförd. d. Gewerbfl.*, are worthy of attention. The object of the German investigator's trials was to ascertain the best temperature of the glass and oil, and the best composition for the glass. The results may be summarized as follows: 1. The hotter the glass is when thrown into the bath, the better it is suited for toughening. 2. The warmer the bath, the better the results. 3. Soft, half-crystal glass, composed of soda, lead, and lime, gives but little better results than pure soda-lime glass. 4. The cooler the glass when plunged, the hotter must be the temperature of the bath. 5. More hollow spaces are formed in the interior of the glass, if its temperature be high and that of the bath low, than if the temperature of the bath be high also. 6. Bohemian glass is not well suited for toughening. Dr. Schott has also investigated the mechanical properties of ordinary and annealed glass treated in a different manner, his tests embracing the effect of tensional strains. The records of his tests show that annealed glass possesses a tensional strength of 3.48 tons per square inch, which is from two to three and a half times greater than the figure usually given, and that by simply cooling glass in the air its strength may be doubled. As a further result, it may also be stated that the hotter the glass and the colder the bath, the stronger will be the finished ware. The former experiments, however, proved that when the temperature of the glass is lower (and this is necessary in practice in order that the shape of the article may be preserved during toughening) the temperature of the bath must be taken higher; and thus the conditions of manufacture do not, as a rule, permit of the glass being endowed with maximum strength. As a result of this, glass of such a composition should be chosen as will give favorable results with a low temperature of the glass and a moderate temperature of the bath. For this purpose a glass rich in silica and poor in lime appears to be best suited. The average tensional strength of the bars hardened in oil was 17 1 tons per square inch, or about double the strength of cast-iron, and five times the strength of annealed glass; in some instances a strength of 34.2 tons per square inch (equal to that of iron wire) was attained. The process of toughening in oil, as adopted by De la Bastie, is not suited to the production of plate glass, for it invariably warps the plates, injures their quality, and the consumption of oil and cost of cleaning are very considerable. To obviate these disadvantages Herr F. Siemens, of Dresden, introduced the method of toughening plate glass by laying the red-hot plate between two cast-iron blocks, with carefully got up surfaces. The upper block is counterbalanced, so as not to press too heavily on the glass plate. A contact of a few minutes suffices to effect the object in view. The proper temperature of the cast-iron blocks depends, to some extent, on the temperature and composition of the glass. As in the case of oil, the strength of the finished glass increases with the difference of temperature between the glass and the cast-iron.

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BUILDING INTELLIGENCE.

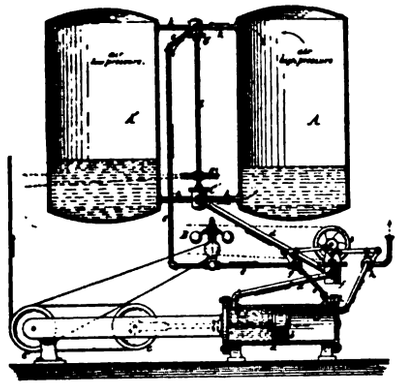
[Reported for the American Architect and Building News.

[Although a large portion of the building intelligence is provided by their regular correspondents, the editor greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

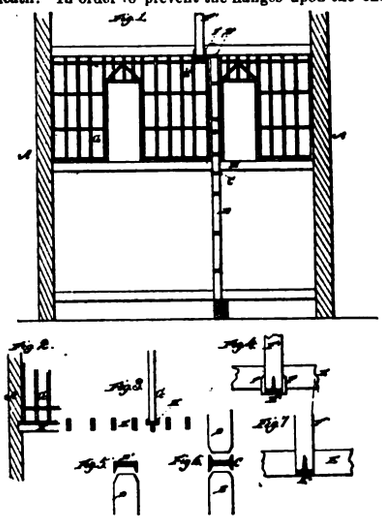
[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

223,464. HYDRAULIC ELEVATOR. — Walter M. Bailey, New York, N. Y. This invention aims to dispense with some of the parts heretofore employed in hydraulic elevators, and to render the action of the apparatus more direct, and to secure greater compactness. *a* indicates the hydraulic lifting cylinder; *b*, the piston; *c*, the movable sheaves to which the piston connects, and *c'* the fixed sheaves over which the cables are wound and extended to the car. A A' indicate the reservoirs, which contain both the supply of compressed air and the charge of water by whose pressure the pneumatic pressure is transmitted to the lifting-piston. The compressed air is thus accumulated directly above the water column, and its pressure is transmitted directly through the water to the piston. Each end of *a* is closed, the front end being connected, by the water-pipe *d*, with the bottoms of the reservoirs, while the rear end is connected by the air-pipe *e*, with the tops of the reservoirs; hence the water may be admitted directly into the front of the cylinder against *a*, under the full pressure in the reservoir, while the compressed air may also be admitted from the reservoir under its full pressure upon the back of *a* to balance the pressure in front. *d* is provided with a valve, *f*, and *e* with a similar valve, *g*, while a third valve, *h*, allows, when opened, a free exhaust



from the rear of the cylinder. These valves are connected, so that they are all operated by the cord extending from the sheave *i*, on the crank-shaft of *f*, and are so arranged that a movement of the sheave in one direction opens *f* and *g*, while the reverse movement shuts both valves; but a continuation of the reverse movement opens *f*, also the exhaust-valve *h*, while *g* remains closed. The apparatus is here shown with *f* and *g* open and the piston performing the descending movement, and it will be observed that the compressed air enters the cylinder behind *a*, under the full pressure from the reservoir, thus balancing the hydro-pneumatic pressure on the front of *a*, so that the descent of the car effects the return movement of the piston, and causes the water in front of the piston to return back to the reservoir, as indicated by the full arrows. To stop the piston and car at any desired point is effected by reversing the sheave *i*, so as to bring the crank to its lower dead-point, thus closing both *f* and *g*. The ascending movement is effected by continuing the reverse movement of the sheave *i*, which will close *f*, but open the exhaust-valve and water-valve, so that the air-pressure behind the piston being thus removed while the water is admitted in front, the full hydro-pneumatic pressure from the reservoir is exerted on the front of *a* to raise the car with a steady movement, which may be checked at any point by reversing the sheave and closing the exhaust and water valves. An ordinary governor, B, controlling the flow of air through the air-pipe *e*, and driven from the last of the series of the fixed sheaves *c'*, is used to govern the speed of the apparatus. Another feature of the invention is the two reservoirs A A', one charged to a low pressure and the other to a high pressure, — say, respectively thirty-five and sixty pounds to the square inch, — connected by two-way cocks, C C', with the air and water pipes leading to the cylinder, so that either the low or high pressure may be turned into the cylinder, according as the load on the car is light or heavy. *k k'* are the pipes connecting the two-way cocks with the air and water spaces of the two reservoirs. C C' are connected by the shaft *l*, fitted with the sheave *m*, from which an independent cord is carried to the car, so that the valves may be opened in either direction, thus bringing either the high or low pressure into action, according to the requirements of the load.

223,734. WOODEN PARTITION. — Francis G. Himpler, Hoboken, N. J. The object of this invention is to avoid shrinkage. A A are the walls of a building, and B the studs of the basement-partition, which stand on the cellar-wall and run up into an iron channel-beam, C. The studs D of the partition in the next story pass between the joists E and set into the channel-beam C, which is double-channelled. When the partition does not continue into a higher story single-iron channel-beams are used as heads, as indicated at D'. Where a free-spanned wooden partition crosses the joists of the floor, and a deep girder below the joists would be objectionable in the ceiling below, an iron sill, E', which is fastened by screw-bolts into each joist, is used. Wooden strips F, secured to the sides of the studs F', so as to embrace the sill E, will keep the studs on the sill. Where a free-spanned partition, G, runs parallel with the joists the girder-sill H is used, the ends of which have their bearings in the walls A, or on the head of a partition runing at right angles underneath. In order to prevent the flanges upon the chan-



nel-beam C from pressing into the joists, an iron plate is secured upon the under side of each joist, which fits into the channel.

224,509. LIFTING AND FORCE PUMP. — Emory Barnes, Mount Pleasant, Mich.

224,530. BORING-TOOL FOR STONE-WORKING, ETC. — Wm. Hasenzahl, Cincinnati, O.

224,534. METAL-PLANING MACHINE. — Samuel E. Hildreth, Worcester, Mass.

224,539. EXTINGUISHER. — William H. Hovey, Springfield, Mass.

224,544. AUTOMATIC DAMPER REGULATOR. Florentine A. Jones, New York, N. Y.

224,546. BOLT MECHANISM FOR LOCKING RANGES OF CELLS. — Gustaf F. Kindt, Montreal, Canada.

224,553. DISINFECTING APPARATUS FOR WATER-CLOSETS, ETC. — Edward J. Mallett, Jr., New York, N. Y.

224,556. WOOD-CUTTING MACHINE. — Joseph H. Phipps, Fenton, Mich.

224,574. ELEVATOR. — Seth H. Bevins and William H. Phillips, New York, N. Y.

224,584. DOOR-SPRING. — Montgomery R. Davis, Jackson, Mich.

224,596. SPRING SHADE-ROLLER. — Daniel E. Kempster, Boston Mass.

224,606. COMPOSITION FOR ROOFS. — Dorwin D. Pennoyer, Boston, Mass.

224,608. GLAZED STRUCTURE. — William E. Rendle, Westminster, England.

224,616. MACHINE FOR CUTTING OFF BRICKS AND TILES. — John B. Smith, Jackson, Mich.

224,618. COMBINED SHUTTER-BOWER AND FASTENER. — Peter V. Stewart and Edward A. Price, South Orange, N. J.

224,619. SHUTTER-FASTENER. — Cornelius Tenney and George W. Walton, Brooklyn, N. Y.

224,625. STEAM STOVE. — John Ashcroft, Brooklyn, N. Y.

224,626. FIRE-DOOR FOR FURNACES. — George H. Babcock, Plainfield, N. J.

224,638. FLUSH-BOLT. — Purmort Bradford, New Haven, Conn.

224,646. COMPOSITE PILE. — Henry Case, Brooklyn, N. Y.

224,660. ARTIFICIAL STONE. — J. Phelps Davis, Middletown, Conn.

224,675. WINDOW-SASH. — Alphonse Friedrick, Brooklyn, N. Y.

224,678. FIRE-EXTINGUISHER. — Almon M. Granger, New Orleans, La.

224,723. ELEVATOR. — George H. Pleasance, Cleveland, Ohio.

224,730. DOOR-SPRING — Thomas Rome, Brooklyn, N. Y.

224,732. ARTIFICIAL WINDOW CORNICE. — Samuel R. Scottron, New York, N. Y

224,752. TENONING-MACHINE. — Jos. J. White and Wm. S. Kelley, Smithville, N. J.

224,760. MACHINE FOR SAWING STONE. — Hugh Young, New York, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since our last report: —

Wilhelm Hundertmark, two-st'y brick dwell., 807 Franklin, between Fremont and Pine Sts.

Wm. H. Hoopes, addition and improvement to store at 84 Eutaw St., between Saratoga and Mulberry Sts.

Wm. Bowers, two-st'y building, rear of 205 Conway St.

John Sigerlin, two-st'y brick building, 162 Register St.

Boston Fear, 3 two-st'y dwells., on Woodyear St.

Anna Puming, 4 three-st'y brick buildings, on Biddle St., near Greenmount Ave.

Physical Culture Association, two-st'y stone and brick building, on Howard St, between Ross and Franklin Sts.

CHURCH. — The vestry of St. George's P. E. Church has resolved to build a church to the memory of the late Bishop Whittingham, to be called the "Bishop Whittingham Memorial Church," and that a committee of three, of which the rector shall be the chairman, be appointed to take steps towards securing a lot and raising funds for building the proposed church.

RAILROAD OFFICES. — Workmen have commenced operations on the B. & O. R. Building. The foundations that were put in some time ago are being uncovered, and the adjoining site, now occupied by the Adams Express Company, has been bought by the B. & O. R. Company, and will be vacated by the 25th inst., when it will be immediately torn down to make room for the new building.

STORES. — Mr. B. F. Bennett is building two new stores and dwelling-houses on Lexington Street, between Park and Howard Streets, to be of brick, with stone trimmings. Dixon & Carson are the architects.

Boston.

BUILDING PERMITS. — Since our last report the building permits granted are as follows: —

Brick. — 374 *Marlborough St.*, for A. E. Harding, 1 dwell., 24' x 44'; S. W. Merrill, builder.

Wood. — *Hilburn St.*, Ward 23, 1 carpenter shop, 20' x 30'; A. Rogers, owner and builder.

Columbia St., Ward 24, Opera-House for M. Merrill 60' x 120'; Wood & Murray, builders.

Repairs and alterations active.

HOUSE. — On Commonwealth Ave., between Fairfield and Exeter Sts., is now building a house for Mr. H. W. Wadleigh, from drawings of Mr. W. W. Lewis, architect; Standish & Woodbury, builders; cost, $25,000.

Brooklyn.

ALTERATIONS. — *Cambridge Place, No.* 80, three-st'y brick extension, 16' 8" and 18' x 22', tin roof; cost, $1,400; owner, J. H. McAuley, 80 Cambridge Place; builder, A. Wilson.

Bedford Ave., cor. Ross St., one-st'y brick extension, 50' x 51'; cost, $15,000; owner, James L. Knapp, on premises; architect, A. Crooks; builders, J. H. Burke and J. Thompson.

Raymond St., No. 295, raised two feet; cost, $1,000; owner, H. Wischmann, 305 Navy St.; architect, Mr. Morrill; builders, E. Boyd and J. Van Saun.

Buffalo.

HOTEL. — Brick hotel; Dr. Cary; R. A. Waite, architect.

HOUSES. — Frame house; F. C. Porter; cost, $3,000; F. W. Caulkins, architect.

Brick house; Captain Davidson; cost, $15,000; R. A. Waite, architect.

OFFICE BUILDING. — Seven-story office building; Dr. White; cost, $85,000; F. W. Caulkins, architect.

STORES. — Four-story brick store, corner Virginia and Main Streets; Geo. Metzger, architect; cost, $7,000.

Overhauling large store on Pearl Street, near Terrace; F. W. Caulkins, architect; cost, $5,000.

Four-story building, corner Well and Seneca Streets; Holmes & Little, architects; cost, $12,000

Four-story stone building, Main, South of Virginia Street; M. E. Beebe, architect; cost, $10,000.

Chicago.

BUILDING PERMITS. — *South Franklin, No.* 88, two-st'y store and dwell., for M. Unger; cost, $4,000.

Arnold and Seventy-fourth Sts., three-st'y factory, for E. Prussing; cost, $12,000.

North Clark, No. 865, four-st'y dwell., for L. Brentano; cost, $6,000.

La Salle St., No. 617, four-st'y dwell., for Charles Bachrack; cost, $14,000.

Van Buren and California, two-st'y store and dwell., for A. Harper; cost, $2,500.

Bishop Court, near Washington St., 3 two-st'y dwells., for M. Schell; cost, $9,000.

Lumber and River, six-st'y elevator, for Charles W. and George H. Wheeler, George Armour and A. Munger; cost, $280,000.

Throop, near Zion Place, store for J. Roukul; cost, $2,700.

Nineteenth, near Throop, two-st'y dwell., for James Opata; cost, $2,600.

Third Ave., Nos. 121 *and* 123, barn, for P. A. Newton Bros.; cost, $2,400.

Canal and Clinton, three-st'y machine shop, for Warren Springer; cost, $30,000.

Ohio, No. 440, two-st'y dwell., for M. O'Leary; cost, $2,000.

Fulton and Diller, 2 two-st'y dwells, for Leonora Diller; cost, $4,000.

Wood, near Ambrose St., two-st'y dwell., for Anton Hammacher; cost, $12,000.

Wilson, No. 82, two-st'y building for F. Kolar; cost, $2,000.

Congress, near Fifth Ave., three-st'y factory, for John A. Lomax; cost, $20,000.

Webster and Halsted, three-st'y dwell., for Charles Knechler; cost, $6,000.

West Adams, No. 540, two-st'y dwell., for A. G. Fisher; cost, $7,000.

Wood, near Blue Island Ave., planing-mill, for O. D. Weatherell; cost, $3,000.

West Adams, No. 712, two-st'y dwell, for Josiah Gray; cost, $2,700.

State, near Thirty-first, three-st'y dwell., for G. B. Cook; cost, $16,000.

Park and Western Aves., 7 two-st'y dwells., for Asbury Lowrey; cost, $17,500.

State St., Nos 419 *and* 421, three-st'y store and dwell., for T. H. Biddle; cost, $14,000.

West Ohio, Nos. 49 *and* 51, 2 three-st'y stores and dwells., for Andrew Madsen; cost, $10,000.

Ashland Ave., near Congress St., 4 three-st'y dwells., with Bedford-stone fronts, for James M. Pyatt; cost, $35,000.

Dearborn, near Thirty-eighth, 2 two-st'y dwells., for John Brown; cost, $5,000.

FLATS. — Mr. Wm. Strippleman is architect of a two-story and basement flat, 22 by 60 feet, on West Twelfth Street, east of Loomis Street, of pressed brick and sandstone; cost, $5,000; owner, M. Hegehorst, Esq.

FOUNDRY. — Mr. Strippleman is also architect of the new foundry and machine shops now building on Canal Street, north of Van Buren Street, for Mr. Warren Springer. It will measure 80 by 320 feet, and be three stories and basement high, of common brick with stone sills, etc.; cost, $50,000.

HOUSE. — Mr. H. P. Smith is building a house on the corner of Forty-seventh and Greenwood Avenue, 29 by 47 feet, two stories and basement in height, of wood. Hall and dining-room will be finished in red oak; cost, $6,000. Wm. Strippleman, architect.

STORES. — Mr. Geo. Armor, of the firm of Armor, Dole & Co., grain dealers, is putting up a large block of stores on the corner of Adams and Franklin Streets. Messrs. Furst & Rudolph are the architects. The block will be built of stone throughout, cornice of stone, except upper member, to be of galvanized iron. The contracts are partly let: cost, about $160,000.

WAREHOUSE. — Douglas & Stewart, owners of the Imperial

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Warehouse, corner of Sixteenth and Dearborn Streets, which burst a short time since, have taken out a permit for repairs that will cost $30,000.

Cincinnati.

Sheep Pens.—Mr. James W. McLaughlin, architect, has just completed plans for buildings to be occupied as sheep pens. The ground is irregular in shape and covers about 50,000 square feet. The building above the ground is frame. One peculiar feature of the design is that there are no windows—pivot slats being used to afford ventilation. The contract, which was let to J. W. Cotteral & Son, was $27,000.

Dormitory.—Mr. McLaughlin has commenced plans for the North Dormitory of the Lane Seminary. The building will accommodate 40 students; each student to have a study and bedroom. The outside walls will be of limestone. Cost, about $20,000.

House.—Mr. McLaughlin is also making plans for a frame dwelling for Mrs. Busche, to be built at Avondale. Cost, about $8,000.

Denver.

Competitions.—All the architects in the city are busy on competitive designs for the new county court-house, and for the new high school-house.

Houses.—Mr. W. W. Goodrich, architect, has in hand three houses for G. J. Washburn, Esq., costing respectively $20,000, $10,000, and $6,000.—A house for A. Goodrich; cost, $3,000.—A house for W. R. G. Hayward; cost, $3,000.—A house for J. A. Chain; cost, $3,500.—A house for Dr. W. Smedley; cost, $6,000.

New York.

Alterations.—*Third Ave.*, five-and-one half-st'y brick brewery, to be raised a full story, etc.; cost, $15,000; owner, John Eichler, cor. One Hundred and Sixty-ninth St. and Third Ave.; architect, Anthony Pfund.

Read St., Nos. 134, 136, *and* 138, four st'y brick office building, interior alterations; cost, $1,200; owners, E. R. R. Co., Erie Building.

Ninth St., Nos. 39 *and* 41, *W.*, 2 four-st'y brick dwells., each to have a fifth story added; cost, each, $6,000; owner, Henry B. Renwick, 29 Park Ave.; architect, Jas. Renwick.

Marion St., No. 54, four-st'y brick factory building, four-st'y brick extension on rear; cost, $8,000; owners, Bradley & Co., Eighteenth St. and Madison Ave.; architect, A. B. Ogden; builder, John Moloy.

Forty-second St., No. 210, *W.*, four-st'y apartment-house, four-st'y brick extension on westerly side, 18′ x 62′; cost, $3,000; owners, N. E. Cornwall and others, on premises; builder, Edward Lennon.

Eighth Ave., Nos. 287 *and* 289, three-st'y brick extension on rear, 50′ x 63′ 6″; cost, $10,000; owners, Ehrich Bros., 287 Eighth Ave.; architect, J. H. Hardenbergh.

Third Ave., 4 brick tenements and store, to be connected on first floor, one-st'y brick extension, 25′ x 20′, on rear; cost, $2,000; owner, Henry Stenbrig; architect, Fr. S. Barus.

Fifty-fifth St. No. 528, *W.*, two-st'y frame dwell., to be raised to three stories; cost, $1,800; owner and builder, G. Sohr, on premises; architect, G. Holzeit.

The building No. 19 W. Tenth Street is to be altered and remodelled, at a cost of about $7,000. Mr. Jas. B. Snook is the architect. The dwelling No. 37 Market Street is to be altered and extended, at a cost of about $6,000. Mr. Jas. B. Snook, architect.

Houses.—Mr. W. Wheeler Smith is the architect for the two houses, Nos. 6 and 8 East Fifty-sixth Street, now building for Mr. Henry E. Hawley. They cover 28 by 100 feet, and 22 by 60 feet respectively. Will be of brick and brown-stone, in Renaissance style. They will be finished in mahogany, oak, and other hard woods. The cost will be about $80,000. The mason is Marc Eidlets and the carpenter is John Donohue.

Office Building.—The building on the southeast corner of Broadway and Wall Street is to be torn down, and is to be replaced by an office building.

Store.—It is reported that Arnold, Constable & Co., in addition to the large store they are to have built on Union Square, also think of building one on Madison Square.

Philadelphia.

Asylum.—*Forty-eighth St.*, cor. Woodland Ave., Home for Incurables, 1 two-st'y and mansard brick and stone building, 44′ x 72′. Won in open competition by Mr. Willis G. Hale; cost, about $18,000; contract not yet awarded.

Churches.—*Trenton*, cor. Cumberland Ave., St. Michael's German Lutheran Church, 53′ 8″ x 91′, pressed brick, stone finish, steeple 175 feet high; architect, W. H. Geissinger; contractor, W. J. Kenderdine; cost, $15,000.

Broad, cor. Oxford St., the Oxford Presbyterian Church, lately burned, is about to be rebuilt. It is expected that it will be ready for occupancy about the first of May. Contractor, Lewis Havens.

Factories.—*Nineteenth St.*, between Brown and Parrish Sts, 1 four-st'y fire-proof brick watch-case factory, 114′ 10″ x 34′ 6″. One boiler and engine-house, 1 st'y, 50′ x 25′; owners, Hoxtoff & Thorpe; contractor, W. J. Kenderdine; architect and engineer, W. H. Geissinger; cost, $15,000.

American, cor. Susquehanna Ave., 1 four-st'y brick factory, for manufacture of wood tool working machinery, 40′ x 115′ 4″; owners, E. & F. Gleason; contractor, the owners; architect and engineer, W. H. Geissinger; cost, $10,000.

Howard, cor. of Huntington St, 1 five-st'y factory, 137′ 10″, with a wing 65′ x 50; to be used for the manufacture of machinery by the owners, Messrs. Campbell & Richards; contractor, W. J. Kenderdine; architect and engineer, W. H. Geissinger; cost, $26,000.

The same architect is now engaged on plans for another factory, same size, for the same owners.

American, cor. Lehigh Ave., 1 four-st'y brick factory, 50′ 4″ x 121′ 9″, with a wing, 31′ 8″ x 35′. Also, for the same owners, 1 two-st'y stable, 42′ x 32′ 2″; owners, the American Machine Co.; contractor, W. J. Kenderdine; architect and engineer, W. H. Geissinger; cost, $35,000.

Thrift File Works, 428 Ireland Street, have commenced to build an addition to their works, which will be 33 by 43 feet, two stories high. They will put in a new engine of 40 horse-power, for grinding only; also 40 new blocks, which will increase their capacity 400 dozen files per week.

The Enterprise Manufacturing Company have commenced their new additions, which will cost them $75,000.

Grain Elevator.—The large Grain Elevator for the Reading R. R. at Richmond is rapidly advancing; the foundation will be completed by April 1, when the frame superstructure will be commenced.

Houses.—2006 *Sansom St.*, 1 two-sty brick stable and dwell, 18 by 95 feet; owner, A. J. Cassatt; contractor, A. J. Myers; architect, Frank Furness; cost, $5,000.

At Fox Chase, 1 stone and timber dwell., 50′ x 60′; owner, W. H. Rhawn, Esq.; architect, Frank Furness; cost, about $10,000.

At Chestnut Hills, 1 stone dwell., 62′ x 47′; owner, Hon. John Welsh, Philadelphia; architect, Frank Furness; contractor, W. C. Mackie; cost, $10,000.

At Chestnut Hills, 1 stone and timber dwell., 70′ x 56′; owner, John Lober Welsh, Esq., Philadelphia; architect, Frank Furness; contractor, W. C. Mackie; cost, $14,000.

At Haverford, 1 stone and timber dwell., 60′ x 34′; owner, J. R. Williams, Philadelphia; architect, Allen Evans; cost, $9,000.

At Haverford, 1 dwell. (Flemish style of architecture), 36′ x 69′; owner, E. C. Evans, M. D.; architect, Allen Evans; contractor, Anderson Wanner; cost, $8,000.

Building.—Building improvements are livelier on Chestnut Street now than they have been at this season for many years.

Office Building.—*Walnut*, cor. Third St., 1 pressed brick and Ohio stone office building, 58′ x 75′, four stories high (fire-proof throughout); owners, the Union Ins. Co. of Philadelphia; cost, $30,000. In an open competition Mr. Theophilus P. Chandler, Jr., was the successful architect.

Providence.

Factory.—The Nicholson File Company is making extensive improvements at its works in this city. The additions are a new hardening room, packing room, and a two-story building, which is to contain the offices of the company. The materials used are brick and stone. Messrs. P. F. & J. M Hull are doing the work. The drawings were made by Messrs. Walker & Gould.

Houses.—Mrs. Danforth is building a large two-tenement house on Parade Street. The contractor for the work is Mr. Alfred Z. Horton; Mr. C. F. Wilcox is the architect.

On Pine Street, between Lockwood and Pearl Streets, there is a group of houses being put up by Mr. D. Russell Brown, at a cost, in the aggregate, of about $15,000. Mr. Jenkins Jones is the contractor. The designs were made by Mr. Frank W. Angell, in the office of Walker & Gould.

San Francisco.

Church.—Mr. T. J. Welsh is the architect of the new Catholic church; cost, $10,000.

House.—Mr H. C. Macy is the architect of a two-story house now building on Frost Street for Mr. E. Slosinsky; cost, $19,000.

Stores.—Mr. Victor Hoffman is the architect of the new two-story brick building for Goldstein & Dreyfus; cost, $27,000.

Mr. John Marquis is the architect of the three-story brick store building for Mrs L. E. Waterman; cost, $20,000.

Warehouse.—Mr. P. R. Schmidt is the architect of the brick warehouse building at the corner of Brannan and Fifth Streets; cost, $7,000.

St. Louis.

Building Permits.—Thirty-eight permits have been issued since our last report. Of these, eight are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows:—

Owners.	Use.	Stories.	Rooms.	Cost.
D. Signigo.	Dwelling.	3	10	$3,500
Miss J. Wilgus.	Dwelling.	2	36	11,000
P. Roemer.	Dwelling.	3	15	4,000
J. T. Barth.	Dwelling.	3	17	6,000
H. Shaw.	Store.	5	5	12,000
Southern Bagging Mills Co.	Factory.	1	3	10,000
T. T. Richards.	Dwelling.	3	9	4,800

General Notes.

Akron, O.—At a meeting of the Music-Hall Association it was decided to build a hall, amphitheatrical in form, to accommodate 3,000 people, at a cost of about $20,000.

Alameda, Cal.—Messrs. S. & J. C. Newsom are the architects of the house building for Mr. Barton, at the corner of Central Street and Broadway; cost, $25,000.

Allegheny, Penn.—Work has begun upon the new station for the Western Pennsylvania R. R.

Attleboro' Falls, Mass.—Messrs. Walker & Gould, of Providence, R. I., are the architects of a new house which is now being built for Mr. Harvey Clapp, of this place.

Carroll, Io.—Mr. W. Foster, of Des Moines, is the architect of the two-story brick school-house; cost, $12,000.

Cleveland, O.—Messrs. Cuddell & Richardson are the architects of the new seminary building for the Sisters of Notre Dame; cost, $12,000.

Clinton, Mass.—The Lancaster Mills, the Carpet Company, and the Wire Works, are all planning additions to their factories.

Des Moines, Io.—Mr. W. Foster is the architect of the block of three two-story stores for E. Good, at the corner of Walnut and Sixth Streets; cost, $12,000.

Detroit, Mich.—Jas. E. Scripps, frame church, cor. Myrtle Street and Trumbull Ave.; cost, $1,000.

Peter Mahoney, frame dwell., No. 60 Spruce St.; cost, $1,200.

C. S. Cole, frame dwell., Alexandrine Ave., near Third Ave.; cost, $2,500.

Sullivan & Tennyson, brick store and dwell., Michigan Ave, near Twentieth St.; cost, $2,000.

W. H. Savory, frame dwell., No. 833 Twenty-fourth St.; cost, $1,000.

Elkhorn, Wis.—The Roman Catholics of this village and its neighborhood have contracted with Messrs. Moore & Davidson, of Delavan, to build a church, to be finished about July 1; entire cost, about $4,000; materials, wood "veneered" with Milwaukee brick.

Erie, Penn.—Mr. D. K. Dean is the architect of the three-story brick block for O. W. De Witt; cost, $12,000.

Gloucester, Mass.—Mr. J. H. Berarick, of Boston, is the architect of the St. Ann's R. C. Church; granite; cost, $70,000.

Great Falls, N. H.—McClellan & Goodwin, of Chicopee, Mass., contractors and builders, have secured contracts for building a new mill and remodelling two old ones.

Gypsum, O.—Mr. E. O. Fallis, of Toledo, is the architect of the M. E. church; cost, $4,000.

Holyoke, Mass.—Messrs. D. H. & J. C. Newton, contractors, have commenced the proposed extension of the Chemical Paper Company's Mill, which is to include a rag-engine department, 137 by 36 feet, two stories; a rotary bleach-boiler department, 41 by 40 feet, two stories; a paper-machine room, 130 by 53 feet, one story; and a steam boiler-house, 32 by 21 feet. D. H. & A. B. Tower, of this city, are the architects.

Hudson, Mass.—Messrs. Lord & Fuller, of Boston, are the architects of two three-story brick stores, one for Mr. Jefts and the other for Mr. Chase.

Huron, O.—Mr. J. Ireland, of Cleveland, is the architect of the brick dwelling now building for W. J. Wickham; cost, $10,000.

Indianapolis, Ind.—William H. English proposes, it is said, to build a theatre, with a seating capacity of 3,000 persons.

Jacksonville, Ill.—The Young Men's Christian Association proposes to build a $10,000 building in the spring. Eight thousand dollars are already subscribed, and as soon as the full amount is raised the work will commence.

Louisville, Ky.—Frank Fehr, two-st'y brick factory, on Marshall St., between Preston and Jackson; cost, $8,000.

Stitzel Bros., one-st'y frame warehouse, on Twenty-sixth St., between Broadway and Maple; cost, $2,000.

Lynn, Mass—The Messrs. Keene, shoe manufacturers, are soon to build two large shoe manufactories near their present factory on Willow and Oxford Streets. The new buildings will be of brick, and have five stories, exclusive of basement. Each block will be 40 by 138 feet.

Another new shoe manufactory is to be built on the Moses Breed estate, on Oxford Street, between Mulberry and Almont Streets, by Mr. P. A. Chase.

The St. Mary's Church Society have the completed plans for the new parish school in hand. The edifice will be 73 by 140 feet, with a 60-foot tower. The building will cost $50,000.

Monongahela, Penn.—It is stated that Campbell, Duncan & Co, glass manufacturers, will build a manufactory if the citizens will contribute $18,000 to the enterprise. It is aided $12,000 have already been raised.

Munroe, Mich.—A two-st'y brick house is building at the corner of First and Scott Streets, under the charge of F. B. Luce; cost, $6,000.

Public Buildings.

Appropriations for Public Buildings.—Some days ago the House Committee on Public Buildings and Grounds adopted a resolution not to report to the House for the present any more bills appropriating money for public buildings. At a later meeting they reconsidered their former decision and granted leave to report favorably to the House the bill appropriating $550,000 for the purchase of a site, at Baltimore, Md., for a post-office. The bills introduced in the present Congress, and referred to this committee, provide for appropriations for new public buildings now amounting to $12,770,500, with six States to be heard from that have not yet put in their claims.

Asheville, N. C.—Mr. Ransom's Senate Bill to provide for a public building has been referred to the Committee on Public Buildings and Grounds.

Carson City, Nev.—Mr Daggett's House Bill to provide for building a public building in this place has been referred to the Committee on Public Buildings and Grounds.

Columbus, O.—Mr. Converse's House Bill to provide a fire-proof building has been referred to the Committee on Public Buildings and Grounds.

Danville, Va.—The bill providing for the building of a public building in this place has been signed.

Frankfort, Ky.—Mr. Blackburn's House Bill to provide for building a public building has been referred to the Committee on Public Buildings and Grounds.

Jefferson, Mo.—Mr. Philips's House Bill to provide for building a United States court-house has been referred to the Committee on Public Buildings and Grounds.

Maysville, Ky.—The Committee on Public Buildings and Grounds has agreed to recommend the request of Congressman Phister, for $60,000, for the erection of suitable government buildings in this city.

Peoria, Ill.—The prospects for securing a government building are very good An appropriation of $500,000, exclusive of the site, will no doubt be made.

Sturgeon Bay, Mich.—The question of building a light-house has been referred to the Committee on Appropriations.

Winston, N. C.—The citizens' petition for a Federal court-house in this city has been referred to the Committee on Public Buildings and Grounds.

Bids and Contracts.

Baltimore, Md.—The contract has just been made for a new gateway at entrance to Druid Hill Park on Boundary Avenue, to cost $9,000. Mr. J. B. Emery has the contract for the stone-work, at $7,300, and G. F. Pagels the contract for the iron-work, at $2,300.

Chicago, Ill.—E. R. Brainerd & Co., of Joliet and Chicago, have the contract for furnishing the the marble wainscoting for the new government building. The contract will amount to about $80,000.

Cleveland, O.—The following were the lowest bids received for completing the new Armory Building: Carpenter-work, J. C. Skeel and P. M. Skeel, $3,487.06; plastering, W. S. Forester, $125; plumbing, C. C. Dewstoe, $532; gas-fitting, George Wilkshire, $367.77.

New York, N. Y.—William J. O'Connor has the contract for carpentry on the new school-house on Lexington Avenue. It amounts to $20,797.

Philadelphia, Penn.—The Public Building Commission lately received the following bids, the contract in each case being awarded to the lowest bidder, except the bids for bricks, which were ordered to be scheduled: Bricks—Wilbur F. Miller, $8 per 1,000; Amos Dotterer, $7.50; Thomas H. Flood, $8; J. E. Dingee, $6.97; Excelsior Brick and Stone Company, $6 73. Brickwork—Alexander Armstrong, $3.25 per 1,000; Samuel H. Collins, $3.42; James Armstrong, Jr., $4 43; Miles King, $4.92. Dressed stone-work—Wm. Gray, for staircase, etc., $60,006: Douglass Bros., $57,250. Brown-stone work—Philip Dougherty, dressed sills to complete interior and ventilating stack, $5,885; Douglas Bros., $6,325. Cast-iron work—C. Rittenhouse & Sons, $2,989; Royer Bros., $1,880. There was only one bid for lumber, that of Gaskill & Sons, who received the contract, at $21 per 1,000 feet. The contract for steam-pipe covering was awarded to the Boyer Steam-Pipe Covering Company.

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THE decision of the Committee of Award in the School-House Competition of the *Sanitary Engineer* is made known. As we said a fortnight ago, nearly two hundred designs were received, coming from all parts of the United States. The plans were marked by the members of the committee on a scale of four hundred, one hundred marks being allowed for convenience of arrangement, one hundred for security against fire and facility of egress, one hundred for lighting, fifty for heating and ventilation, and fifty for sanitary appointments. The four premiums were given in order to Messrs. Arthur T. Mathews, of Oakland, Cal., Samuel J. F. Thayer, of Boston, H. C. Koch, of Milwaukee, and R. E. Kennedy, of Philadelphia. The six other plans selected for mention were those of Messrs. H. E. Siter, of Boston, F. C. Merry, of New York, Frederick Baumann, of Chicago, W. P. Wentworth, of Boston, Clarence Sumner Luce, of Boston, and J. Appleton Wilson, of Baltimore. These awards were made with no reference to the architectural merit of the designs; but the Committee make honorable mention, independently of the award, of the architecture of the designs marked Square (Mr. Mathews's), Pestallozzi, Tom Pinch, Fiat Lux (Mr. Kennedy's), Philadelphus, Try (Mr. Siter's), Pro Bono Publico (Mr. Wilson's), Multum in Parvo, Docendo Dicimus, and Qui Tam (Mr. Luce's).

THE terms of the competition were arranged, it will be remembered, to suit the kind of lot which is usually assigned to school-houses in New York city. It is not surprising, therefore, to find the Committee of Award declaring that none of the plans submitted fulfil the requirements of a sanitary school building; and adding that "the conditions imposed on the competitors were of such a character that it is probably impossible to produce a plan which should be recommended as one to be constructed." In other words, the final lesson of this competition is, like that of the previous one, that the thing which is customarily attempted cannot be successfully done under the most favorable circumstances. The tenement-house experiment showed that a proper tenement-house cannot be built on the ordinary New York lot, under the ordinary requirement of four families to a floor. The school-house experiment shows, as we argued when it was first announced, that proper accommodation cannot be provided for eight hundred school-children on a lot one hundred feet square, enclosed on three sides. And the Committee is discreetly careful in recommending the selected design "only as the best plan for a school building to be built in a huge box, lacking one side and without a top, the sides of which box are about sixty feet high, which seem to be the only conditions under which school buildings have been erected in New York, and in which from fifteen hundred to twenty five hundred children have been crowded." We may join in their hope that the experiment and the public attention it has attracted may tend to some legislation "enforcing a change in the present methods of selecting school sites and of erecting school buildings."

CONSIDERING that the regulation of architectural competitions has been the great problem of our profession for a generation, it is significant of uncommon difficulties that it is no further ahead now than at the beginning of the generation. But all the while the habit of competition has been gaining ground, till now its machinery is habitually called in for work for which it is altogether unnecessary. In England, both the Institute and the Architectural Association have occupied themselves anew with it of late. A short time ago, in a paper read before the Institute, Mr. Thomas Porter, Fellow, gave some very impressive statistics, which he had collected, of the number and enormous cost of open competitions held in England during a year or two past, and made an earnest appeal for some agreement on the part of members of the Institute to refrain from open or unregulated competitions. Mr. Porter had examined and tabulated the records of a great number of open competitions advertised in the English building papers, a thing which nobody has ever taken the pains to do before, we fancy. He finds that the average number per year noticed in the *Builder* during the last twenty-three years is about fifty. By an analysis of one hundred and seventeen advertised within two years and a half he finds that the average number of competitors is twenty-three, and, assuming from his own experience in competitions that the average number of drawings furnished with each design is eight, he computes 11,648 drawings furnished during each year, at an estimated cost of 23,296 pounds sterling. This he considers a low estimate, and taking into account that there are many competitions which do not appear in the record, and that the amount returned to the architects in the form of premiums is trifling, he concludes that he is within the mark in saying that the average unrecompensed cost of these competitions to the profession is £500, or the aggregate in a year throughout England £25,000, — say $125,000, — making no allowance for the time and labor of the architects themselves who offer them, and that the whole sum wasted on them by English architects in twenty-three years since the great competition for the Government Offices in 1857, of which we not long ago quoted Sir Gilbert Scott's account, is not less than half a million sterling; these estimates being not of the actual value of the drawings, but of the mere cost of preparing them.

THE discussions which followed Mr. Porter's paper, and that read by Mr. Walker, also a Fellow of the Institute, a week later, before the Architectural Association, showed very distinctly what indeed was well enough known before, and what is the real occasion of the whole difficulty, — that the profession is by no means agreed as to competitions. Many members, like Mr. Porter, were in favor of discouraging all competitions as much as possible; others accepted them as a necessary evil, to be controlled as far as might be; and some, speaking well of the bridge that had carried themselves over, regarded them as the young architect's only access to the successes of his profession. The general drift of opinion might have been anticipated, — that whether competitions are desirable or not they are demanded alike by the public and by architects, and therefore will exist; and this being the case, that the only thing that can be done is to abate their evils by every practicable means, the favorite amelioration seeming to be the appointment of professional judges. The most original contribution was that of Sir Edmund Beckett. The system of competitions, thought Sir Edmund, was simply the architects' system of advertising, — the counterpart of what exists in other kinds of business, — and if it costs them money that was only natural. As for making regulations, he would have none of them, and if he were a member of the Institute he would not obey them if they were made. An appeal to architects to hold themselves in restraint on the ground of sentiment or dignity simply meant the sentiment of the breeches pocket. Architects seemed fond of calling themselves artists, but so were singers and cooks, and if he were an architect he should not call himself an artist. (It may be added that when Sir Edmund has tried to be an architect nobody else has been tempted to call him an artist.) Artists, nevertheless, were as much given to competition as anybody else. In fact, competition was the soul of trade, as monopoly was plunder. The Institute, having got Sir Edmund as a member, probably felt obliged to listen to his opinion, and if experience goes for anything it had abundant reason to know that good manners were not to be expected from him; but that an eminent barrister should fail to recognize a difference be-

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tween competition and competitions was perhaps beyond calculation.

As to the objections to competitions other than their cost, they have been often stated essentially as they were stated by Mr. Porter; but he laid stress on one evil tendency which is commonly overlooked, — their tendency to a hurtful influence on the habits of the men who make the designs and on the draughtsmen who execute them. They not only encourage architects, he argued, to design on imperfect knowledge of the conditions of their work, and to put into the designs things that will make an immediate impression on the inexpert examiner, with little effort at a thorough working out of the problem set, but they raise up an army of draughtsmen whose business it is to make things look well on paper, but who know and care little about constructive requirements or adaptation to practical needs, — dress-soldiers who appear well on parade, but who are of little value for real service. The prevalence of competitions and the habit of making show-drawings for them in England make this class of draughtsmen more numerous there than they are in this country. "What has been the history," asks Mr. Porter, "of the men who have engaged in the preparation of the two hundred and sixty-seven thousand waste drawings made in competitions since the time of the Government Offices in 1857? Their history is written in many cases in blighted hopes and ruined prospects." Their work leads to nothing; they do not become architects; their career is unsatisfactory and precarious, and the effect of their work on the profession is demoralizing rather than anything else.

The mechanical industries of the country struggle against a sea of troubles. The return of an appearance of prosperity is the signal for a general demand among workmen for higher wages and for an outbreak of strikes. Twelve hundred cabinet-makers are on strike in New York, it is said, chiefly from Herrman's furniture factory and Steinway's piano factory. A large number from the same trade are out in Cincinnati. The United Order of American Carpenters in New York is preparing to demand an increase of fifty cents a day in wages, and it is expected that the hands in other building trades will do the same. A like movement is on foot in Cincinnati, where a meeting of journeymen carpenters has resolved to form a union, and given notice to their employers of a demand for an increase of twenty-five per cent after April 1. In Cohoes, N. Y., four thousand mill hands are on strike. There are lesser strikes, of various importance, in other towns, and the hands in the mills at Fall River and North Adams are calling for an increase of fifteen per cent, some of those in North Adams giving force to their demand by striking, though thus far without effect. In Troy some strikers among the metal-workers have gone so far as to offer violence to their employers; others have tried the plan of intimidating their fellows; but in most places things have not got to the condition that invites extreme measures. As yet the battle does not incline to the workmen; but these are only symptoms of what is likely to be a pretty general movement in all trades, at least unless the workmen fail signally in the first attempts. A rise in wages in the building trades may naturally be expected, since it is a regular phenomenon of the spring, when the building season begins. Manufacturers, we fancy, are hardly yet sure enough of their profit to be ready to yield to their men if they can hold their own. The piano manufacturers of New York, indeed, have pledged themselves to a general lockout after the 15th of this month, in case the men from Steinway's factory do not return to their work before that time. Mr. Herrman, on the other hand, having, as he says, lost much money by keeping his men at work during the dull season, proposes, in case they persist, to close his factories altogether.

The last report of the Massachusetts Bureau of Labor and Statistics records the experience ofa large number of strikers in that State, and reads a lesson which might be profitable to workmen, if they would learn it. It counts one hundred and fifty-nine strikes, of which one hundred and nine failed altogether, sixteen were compromised, and only eighteen actually succeeded. The cost and indirect evils of strikes are strongly insisted on. The most disastrous were those at Fall River last year. The actual loss in wages to the strikers was near a million and a half of dollars, and there was absolutely nothing to show for it: the report computes that even if, at the end of the fifteen idle weeks, the strikers had gained the fifteen per cent advance for which they struck, it would have taken them two years to make up their losses. The report further shows that if the hands had put into a coöperative venutre the capital which they sunk in the strike, they might have built with it a mill of twenty-five thousand spindles, and furnished it with machinery and working capital. We confess we very much fear that in the end the hands would have sunk their capital all the same, but the mill would have remained as so much added wealth to the community, and they themselves might at least have got more instruction from it than from a fruitless struggle. The conclusion of the report is that the strikes have been ineffectual in regulating the price of labor, except through the indirect process of shortening the day's work. It is also recorded that the most of the strikes and troubles were set on foot by foreign operatives; that of these the most factious and unreasonable were the British workmen, and that our trades-unions and our agitators have been imported from England.

In San Francisco the workingmen, excited by their quarrel over the Chinese, seem to be bringing the labor question nearer to its ultimate conclusions than anywhere else. The new constitution, adopted last year through the efforts of the workingmen, and discriminating against the employment of Chinese labor, gives them a handle by which to stir up trouble. Continual agitation of the question having had its natural effect in discouraging business and driving capital out of employment, the men find themselves worse off than before, and the unemployed more numerous. This inconvenience, like the rest, is visited on the unlucky Chinese. The sand-lot speeches have lately been fuller than ever of threats of violence. A committee of the unemployed has visited the principal corporations which employ Chinese labor to remind them that the new laws forbid corporations which are chartered by the State from giving employment to any Chinese, and enforcing their appeal by the hint that "the welfare and safety of our city" require compliance with it. Doubtless the laws which prohibit the employment of the Chinese violate the provisions of the Burlingame treaty, which guarantees the Chinese against discriminations, and so conflict with the Federal law. Some employers have declared themselves ready to defy the laws and test their constitutionality in the courts, which has drawn from Kearney and his followers an emphatic declaration that they will not accept the decision of any courts against them, and that the Chinese must go.

There is without doubt much hardship among the working classes of the city, as there must needs be wherever their ungoverned turbulence interrupts the course of industry; and the movement to secure charitable aid for them naturally fails in the face of their violent action. It is said, however, that a committee of the Chamber of Commerce has decided, more perhaps as a measure of precaution than as a charity, to raise funds to employ several hundred men on some public work at a dollar a day. The repeated threats to burn the Chinese quarter, and the denunciation of those who employ its inhabitants, have stirred up much uneasiness. A large increase of the police is only a natural precaution, but one curiously offensive to the mayor, elected by the workingmen, who, while counselling his party to moderation and obedience to law, does not scruple to add, "If I thought labor would forever be given to Chinese dogs I should advise you otherwise." The Board of Health, meanwhile, has been inspired to propose an ingenious solution of the difficulty by sending a committee to inspect the Chinese quarter, and, on learning their report, by declaring the quarter a nuisance which ought to be abated. Perhaps this is true; but if we were to act on this principle wherever it applied equally well we should have a large quarter to demolish in every considerable city in the world. The effect of all this disquiet is naturally most disastrous to San Francisco, and though the appeal of the Chinese companies to the Government for protection, the threatened employment of troops to preserve order, and the revival of the traditions of the "vigilance committees" seem for the moment to have awed the leaders of disturbance into comparative quiet, the air is full of anxiety and the possibility of danger. The workingmen of San Francisco have an opportunity to push their doctrines to their last result which is lacking elsewhere. If a *reductio ad absurdum* must be tried and the battle be fought to extremity, the people of the rest of the country may hope that the remoteness of the strife and the result of it will save them from being invaded by it.

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THE POROSITY OF BUILDING MATERIALS.[1]

LANGE gives, by calculation from such experiments,[2] the pressure on the outer walls of a house 20 meters high, at a barometric pressure of 718 millimeters, the inside temperature being 27.3° C. and the outside temperature 0° C., 1.114 *kilograms per square meter of the exposed surface.* The amount of ventilation resulting from this pressure depends upon the nature of the building materials used, and may be easily calculated when the latter is known.

As for the second consideration, the diffusive power of gases, its influence upon the ventilation of a house through the outer walls is, owing to the small difference in the mechanical mixtures of the air within and without, and to the consequent diminutive pressure against the walls either way, *too small to be appreciable*, and it may therefore be ignored.

By far the most important agent in natural ventilation is the wind.

The following table, calculated from Peclet and Smeaton,[3] shows the pressure of a direct wind per square meter.

Velocity in Meters per Second.	Velocity in Kilometers per Hour.	Remarks.	Pressure in Kilograms per Square Meter.
0.5	1.8	Breeze hardly felt.	.03
1.	3.6	Breeze sensible.	.2
2.	7.2	Moderate or pleasant wind.	.5
5.5	19.8	Quite strong wind.	4.5
10.	36.	High wind.	20.
20.	72.	Very high wind.	56.
22.5	81.	Storm.	78.
27.	97.2	Severe storm.	105.
36.	129.6	Hurricane.	186.
45.	162.0	Hurricane which uproots trees and overthrows houses.	290.

For an average velocity of the wind of 27 kilometers an hour we should have a pressure of one half kilogram per square meter. A wind stronger than 36 kilometers an hour would be exceptional, and is not to be reckoned upon. This would give us, according to the table, 22 kilograms per square meter. But in all cases it is necessary for the wind to strike the surface at right angles in order to exert upon it a pressure corresponding to that shown in the table. In consideration of the great variety of force and direction of the wind, it cannot be counted upon as a reliable source of ventilation, our table showing a pressure varying all the way from 0.03 kilograms to 290 kilograms per square meter.

It remains now to ascertain the effect of this pressure in transmitting air through the walls of our buildings. The air may be forced through the wall in two ways, namely, either through the accidental cracks at joints, or through the pores of the materials themselves.

No arguments are needed to show that the ventilation coming from the former is so uncertain in its amount and so disagreeable and dangerous in its character, that every precaution should be taken to reduce it to a minimum. By the use of good cements, packing, and rubber mouldings, it may be reduced to so minute an amount as to be practically inappreciable.

Porous building materials have the advantage of greater capacity for warmth. The conductibility decreases as the porosity increases, and what air passes through the walls of a building is warmed in its passage. But inasmuch as the loss of heat in radiation from the outer walls into space is the same for an equal difference of temperature between these walls and the objects receiving the rays, such a transmission of cold air through them must cool them to an extent nearly corresponding to its amount, and deprive them largely of their healthful action in radiating heat upon the bodies of the occupants. The greatest desideratum in heating is to have the walls and floor of a room as warm as possible, leaving the breathing air comparatively cool; and anything tending to destroy this effect should be avoided as far as possible.

Experiments have been made by Pettenkofer, Schultze, Märcker, Lange, and others on various buildings, to determine the quantity of air passing through the walls in a given time, under a given pressure. Pettenkofer found that the amount of air which passed through the walls of his study, per hour, was 0.245 cubic meters per square meter of wall-surface for a difference of 1° C. between the external and the internal temperatures. But these experiments give no reliable or accurate data for practice. The only way to obtain correct results is to make the tests on a simple scale with small pieces of material under a known pressure.

The principal building materials used in different countries differ greatly in their permeability to air. In Germany they appear to be in general more porous than in this country, so that, perhaps, for this reason the need of artificial ventilation is less directly felt with the Germans than with us.

Of all building materials none differs more widely in the matter of porosity than baked clay or terra-cotta, the material most extensively used. In the form of certain kinds of fire-brick its porosity resembles almost that of a sponge, while in the form of vitrified or glazed tile it is absolutely non-porous. A piece of semi-vitrified terra-cotta, used in a furnace constructed by the writer, was tested by him, and found to permit only 9 cubic centimeters of air to pass through per hour, under a pressure of 10 centimeters of a water column which is equivalent to a pressure of 10 grams per square centimeter. The piece was 30 millimeters thick, and presented a surface of 35 square centimeters to the pressure. For a surface of 1 square meter the amount of air forced through would have been 2.6 liters per hour, under the same pressure of 10 grams per square centimeter.

Other pieces, in the form of brick, were tested by Dr. Henry P. Bowditch, with the following results: —

Four Taunton bricks allowed the air to pass at the rate of about 62, 160, 106, and 795 liters respectively, per hour, for the same surface (1 square meter), same thickness (3 centimeters), and same pressure (10 grams per square centimeter). North Bridgewater bricks gave 66 and 132 liters; a New York brick, 330 liters; New Jersey bricks 24 and 53 liters; a Philadelphia face brick 891 liters; a hard Eastern brick, 165 liters; and a Danvers face brick, 231 liters. Ohio sandstone gave 990 liters.

The apparatus used for our tests is represented in Fig. 145. Air was

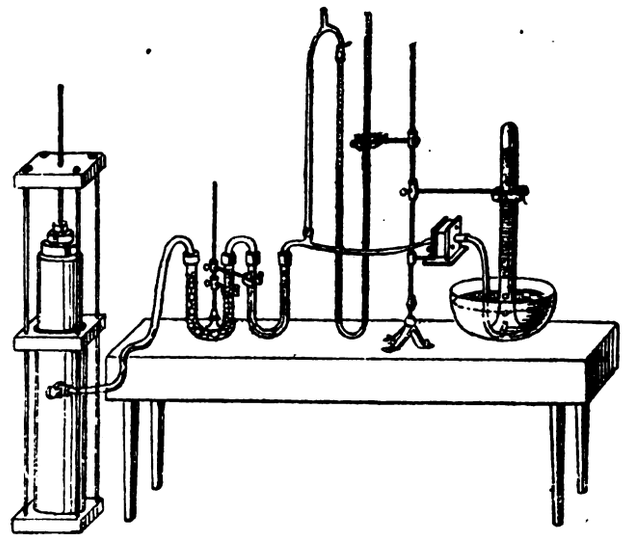

Fig 145.

compressed in a gas-holder shown at the left of the table and conducted by a rubber tube to two bent glass tubes containing, the one chloride of calcium and the other sulphuric acid, in passing through which it was thoroughly dried. The pressure was measured by a water manometer, and the piece of material to be tested was held between two cups of iron securely connected with the rubber tube in such a way that the compressed air could enter freely one exposed side of the sample and escape at the opposite side. The four remaining sides were covered with an air-proof cement composed of wax and rosin to prevent the escape of air at any other points than that covered by the cup and tube opposite the one delivering the fresh air, and the whole was kept under water during the test, so that any escape of air might at once be detected by bubbles. The air thus pressed through the material to be tested was finally delivered into a graduated glass vessel inverted over a basin of water, and measured. The same apparatus was used for testing the soapstone before referred to.

The apparatus used by Lange in making his more extended tests in Germany was similar to that above described, except that he measured the volume of air before instead of after passing it through the material to be tested. This method was less exact because some of the air measured might not be actually transmitted through the material, owing to leakage.

The observations of Schürmann[4] and Lange show that the amount of air passing through porous materials of homogeneous structure under constant pressure is inversely proportional to the thickness of the pieces tested.

Lange gives the following table showing the permeability of various materials under a constant pressure of 10 grams per square centimeter, and the amount of air in liters or cubic decimeters passing through them per hour, per square meter of surface, the pieces tested being 30 millimeters thick.

According to Lange and Märcker, burning increases the porosity of brick up to the point of vitrification, when it becomes non-porous. The different kinds of bricks vary greatly in porosity. Mortar is exceedingly porous, but after remaining some time immersed in water it becomes less so. We see by the table that Portland cement transmits 492 liters per square meter, under the slight pressure of 10 grams to the square centimeter, or about the hundredth part of

[1] This paper by the writer of the Open Fire-Place articles will be incorporated with those articles in their separate form.

[2] See page 80.

[3] Fortschritte der Physik.

[4] Jahresbericht der chem. Centralstelle für öffentliche Gesundheitspflege in Dresden.

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one atmospheric pressure. It cannot, therefore, as in the form of concrete for basement cellars, be considered by any means as air or damp proof.

Materials Tested.	Amount transmitted in Liters.	Its Permeability is represented by
Green sandstone (Bavarian)	468	0.130
" " (Swiss)	426	0.118
Limestone (calcareous tufa)	28,728	7.980
ARTIFICIAL STONES.		
Brick, sandal brick of Opnabruck	1,398	0.383
" lightly burnt hand made (Munich)	312	0.087
" hard burnt " "	732	0.203
" machine-made, "	474	0.132
CEMENTS.		
Mortar	3,264	0.907
Beton	930	0.258
Portland cement	492	0.137
Plaster (gyps.) cast	146	0.041
WOODS.		
Oak	24	0.007
Pine	3,636	1.010

The different woods vary greatly, pine being more porous even than mortar, and oak less porous than the densest brick. Tufaceous limestone was found to be the most porous substance tested.

The different kinds of bricks and sandstones vary greatly. Ten different kinds of sandstone given by Lange varied between 0.3661 and 0.009 cubic meters of air transmitted under the same pressure in the same time, the French sandstone tested transmitting 40 times as much air as the German (Sollingsandstein), which was the least porous.

Lange found that a coat of water-glass (silicate of soda or potash) diminished the porosity, and the more so the longer it stood, until after a certain time it rendered it entirely non-porous. Oil paint acted in the same way as long as it was new. Water-color with glue size (Leim farbe) diminished greatly the permeability, more than half, and the more the stronger the sizing. Lime water-color (Kalk farbe) diminished it the least. Papering diminished the porosity more or less according to the nature of the paper and the thickness of the paste used in hanging it. The diminution of the permeability varied for different tests between 18 and 75 per cent.

Dampness, due to rain on brickwork, etc., diminished the permeability according to the degree of the moistening, in some cases rendering a porous material absolutely non-porous, as in the case of Beton and Portland cement.

Knowing, then, the permeability of our building materials and the pressure of the wind, it is easy to calculate the natural ventilation in any given case. Suppose, for instance, we have a room 6 meters square and 4 meters high, with one exposed side, and that the exposed side contains a window 1 meter wide and 2 meters high. The walls are 40 centimeters thick, 30 of which are brick, 4 air-space, 3 lath, and 3 plaster, and present a surface of 24 square meters to the outer air. Take out 2 meters for glass surface, because glass is non-permeable, and we have 22 square meters of brickwork exposed. We have found that 1 square meter of hard Eastern brick 3 centimeters thick will admit 165 liters of air under a pressure of 10 grams per square centimeter. We have, by our table, for plaster 146 and for laths 3,636. But supposing their permeability and that of the mortar to be the same with the brick, we have, for over 40 centimeters thickness of wall, $\frac{165 \times 3 \times 22}{40} = 250$ liters of air transmitted under the pressure of ten grams per square centimeter, or 100 kilograms per square meter.

This pressure is, by the table, equivalent to that of a severe storm bearing directly upon the house.

For a moderate wind the pressure would be about 250 times less, and we should have a ventilation of only one liter per hour. For a Philadelphia face-brick wall we should have about 5 liters per hour, up to 500 liters, or half a cubic meter, in case of a severe storm. For a gentle breeze, direct, it would be about 2 liters per hour, and at right angles with the wall, say, 1 liter again per hour. If the wall were papered on the inside or painted in distemper, these figures would be reduced, say, one half, and if oil paint were used the ventilation would be reduced to nothing.

Where the walls are built of the limestone given in Lange's table as transmitting 28,728 liters per hour, the ventilation in a high wind would amount to $\frac{28,728 \times 3 \times 22}{40} = 47,388$ liters $= 47.4$ cubic meters per hour, or 0.8 cubic meters per minute, an amount quite sufficient for a single occupant. Thus we see that the ventilation, left to the natural permeability of the material, would vary with every material and with every change of the wind, being greatest when the wind was highest and the exterior air was coldest, or in other words, when least desired. It is therefore in the highest degree unreliable. Such a form of air supply is objectionable, too, in most cases, on account of its cooling action upon the surrounding walls. We have seen that (calculating from Lange's figures) a building material may admit air enough to supply one person for every 22 square meters of wall-surface exposed directly to the wind.

The matter assumes, then, considerable importance, and demands of the heating and ventilating engineer careful study. Indeed, it is easy to obtain bricks and stones so porous that a candle may be blown out by a slight effort of the breath through pieces many centimeters in thickness. The experiment may easily be performed by any one by attaching rubber tubes to opposite sides of the sample to be tested, and covering the remaining sides with wax in the manner described.

While, therefore, it may for many reasons be desirable to employ porous materials for building, these materials should be carefully coated with non-permeable substances, either outside or inside, or both, and every precaution possible should be taken to prevent the entrance through them of the outer air, though I am aware that this conclusion is exactly the reverse of that held by Lange and others.

If there were cases where no other sufficient fresh air supply *could* be obtained than through the pores of the building materials, natural ventilation might be recommended. As it is, there are, unfortunately, many buildings in which no other sufficient supply *is* provided, and natural ventilation then becomes, in spite of us, a great good; but as our question here is with well, and not ill ventilated buildings, accuracy and success in our arrangements requires us to know its greatest extent and provide against it.

ARCHITECTURE AND UTILITY.

[From the late Professor Barry's Lectures at the Royal Academy.]

The connection between architecture and utility, having always existed, gives a practical answer to the doubts which are sometimes felt as to its influence in the future. Rightly considered, such a connection is natural, and to be cherished. Take the question of imitation; we know there is always some fashion in art in these days, which have no style of their own. Public taste may one day turn to Greece, at another to Rome. It may declare the supremacy of Gothic, or discover the merits of "Queen Anne." Now, if we are convinced that architecture must be based upon utility, any direct imitation of ancient models will be recognized as unreasonable and inartistic. We do not want, for example, our Christian churches to resemble heathen temples, however well copied from beautiful designs. The charms of these flowers of art do not bear transplanting, and by thus losing appropriateness they become "matter in the wrong place," and therefore incapable of giving pleasure. We must, no doubt, base our work on the traditions of the past, but the actual copying of existing buildings is not art, but archæology. The use for which a building is required must affect its architectural forms, or these will fail to satisfy and charm us.

Architecture, therefore, recognizes utility as the basis of her work, on which she erects a superstructure of her own, with grace of proportion and beauty of ornament. Without such additions utility alone would give us not architecture, but only building.

The greatest works of the present generation, those of scientific engineering, are of the latter class. In them, the actual necessities of construction have alone been recognized, with the results that may be seen, for example, on the Surrey side of London Bridge, where one of the finest old churches we possess is hemmed in by iron structures of surprising ugliness. If the conviction, which I endeavored to explain to you in my last lecture, were duly recognized, namely, that architecture is a matter of public interest, any such disfigurement of our public places would not be permitted, and while the argument of utility must always have great weight, it would be carefully scanned, and not be permitted, as a matter of course, to override all other considerations. If, for example, it be conceded that to bring a railway into the centre of a town is a public gain, it does not follow that those who undertake such a useful work have any right to deface the thoroughfares, and destroy the beauty of surrounding architectural monuments. Still less does it follow that ugliness of design is *necessary*, or that the required utility could not be obtained without artistic disfigurement and loss.

If only people really cared for these things, a way would soon be found to reconcile apparently discordant claims; but this will not be done as long as apathetic legislation gives powers to railway companies to do as they please, after which it is useless for us to fill the air with outcries at the natural result.

To combine art with science in utilitarian structures must, however, be a task of difficulty with the architect and the engineer, for one of our greatest perplexities will always be that of cost. If the utilitarian purpose can be served by a small expenditure, while a more artistic structure will cost a relatively enormous amount, it must be evident that the latter rests under a heavy disadvantage, in pleading its cause.

You will often be told that it is as easy to make a good design inexpensive as costly, but such doctrine is open to many exceptions. The use of iron-work, instead of masonry, for example, is a case in point. No one would like to see the iron roofs of our railway stations adopted as architectural precedents, and we had recently, in the case of London Bridge, an illustration of the difficulty to which I have alluded.

Here, it was stated that the bridge was so thronged that an additional width was required as a matter of urgency for the public con-

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venience. A plan was propounded for giving such extra width by iron arches, added, one on each side of the existing structure of masonry. The cost of such additions, it was said, would be small; whereas, to widen the bridge with masonry in the obviously more suitable manner, in an architectural sense, would be so costly, and fraught with such danger to the existing structure, that an improvement urgently demanded by public wants could not be obtained at all if a masonry design were insisted on. Here, then, there was a direct conflict between utility and art. The existing bridge is one of the best specimens of bridge-architecture in the world; but if it were found to be inadequate to the public needs, what claim could it, as a utilitarian structure, advance for exact preservation? If, moreover, it were definitely proved that masonry additions could not be made without imperilling the present foundations and superstructure, and that it must either be widened by iron or not at all, it would be a great responsibility for artists to assume, if it were to be declared that the thousands and hundreds of thousands who use the bridge daily must be forever inconvenienced by a thoroughfare too narrow for the traffic of a great commercial city.

Fortunately this dilemma was avoided, as the practical necessity of the case was held not to have been proved to the satisfaction of Parliament.

A well-designed bridge is, perhaps, as good an illustration as can be found of architecture as a useful art. Some of you, no doubt, know how picturesque an object such a structure became in the hands of mediæval architects; as, for example, at Prague, where the old forms of arches and parapets, with the towers and archways of access, still remain.

Old London Bridge, again, is known to many of us, from pictures and engravings, and must have been a highly-interesting subject to the artist. The Ponte Vecchio at Florence is another instance of the same kind, and, like Old London Bridge, was lined with shops. London Bridge was, indeed, not only a means of communication between different parts of the same great city, as with us, but it also formed in olden times the gate or entrance to the City of London. Some of the houses upon it were of considerable architectural pretension, with passage-ways through them for the public. A chapel was, in accordance with custom, a portion of the bridge buildings, so that the passer-by might have the opportunity of praying for the success of a journey about to be commenced, or of giving thanks for his safe return on its completion.

Looking to the interest, both architectural and historical, which concentrated itself in Old London Bridge, its removal in favor of the present structure must have caused many a regret, and might have been expected to excite to frenzy any society for the preservation of ancient monuments, if such a fraternity had then existed. The time came, nevertheless, when Old London Bridge, with all its picturesqueness, had to be surrendered, because it did not comply with the principle of combination of utility with art. The old bridge-builders had done their utmost, and had constructed such piers and arches as were then considered the best possible; but with increased scientific knowledge these had become intolerable, and an obstructed waterway could no longer be permitted. New London Bridge thus arose from utilitarian considerations, and was, in like manner with its predecessor, an example of the constructive art of its day.

Now that science would appear to have adopted iron or steel as the bridge-building material of the time, it is probable that the days of stone bridge-building are over, and that an engineer, if entrusted now with the erection of another new London Bridge, would propose an iron structure. However much we may regret such a conclusion, it appears to be inevitable, as the primary purpose of a bridge is utility.

Assuming, therefore, that in the future the forms of our utilitarian architecture must be modified, it is for those who would cherish and preserve its artistic elements to consider how far such suggested changes are really essential. It is not to be too hastily assumed that ugly structures are convenient, still less that to be convenient they must necessarily be ugly.

Take another instance of bridge-building. The Menai Straits are spanned by two bridges. The problem was the same in each case, namely, to carry a roadway across the Straits, at a great height, and with the least possible interference with the navigation. The one bridge was necessary for the turnpike road, the other had the more difficult task of supporting the great weight of a railway.

In the first case, the engineer adopted the principle of suspension, and all who have seen Telford's bridge will, I think, admit that far from disfiguring the view, or being a blot upon the landscape, it is a thing of interest, if not of actual beauty, which few would wish absent.

Now, let us consider the case of its younger neighbor, the Britannia Bridge. Here we have the adoption of the trabeated principle of large iron beams laid upon supports of masonry, which rise from the valley beneath, and tower up above the beams, to a height far exceeding that which is necessary for their support.

I well remember the animated discussions in scientific circles as to the form and design of these beams, which were ultimately decided upon as rectangular tubes. In the many discussions of the merits and defects of circular, elliptical, or square sections, I do not recollect that a word was said of architectural effect. Had any one ventured to suggest that this too was an important matter, and that an unsightly structure would be an eyesore for all time, he would have been promptly told that the forms to be employed were an affair of science alone, and that utility, pure and simple, would dictate their arrangement.

In the result, a lovely valley was defaced by one of the most unsightly structures of this mechanical age. Now the question arises, was this necessary? Let us see. The Britannia Bridge has, at any rate, escaped the flattery of imitation, and the next great bridge which was erected in another part of England differed greatly from it. The distribution of metal in the section of the tubes was questioned, and if the bridge was to be built now, it is perhaps not too much to say that its distinguished author, if he were now alive, would almost certainly adopt a different design.

It is known that the great height of the towers is due to the contemplation of the possible necessity for chains of suspension, to aid in the support of the horizontal beams. The architectural result is unfortunate. A pier or a column is an appropriate expedient to support a weight placed on the top of it. Here the tubes are not on the top, but about two thirds up, and pass through the piers in such a manner as to lead us to wonder how the masonry of the upper parts is supported. The towers, being obviously unnecessary, fail to please, in contrast with those on mediæval bridges, to which I have just referred, the purpose of which was obvious to every passer-by.

The deficiencies of the Britannia Bridge, in an artistic sense, are not, therefore, really due to the dictates of science and utility, but to imperfect apprehension of them, resulting in the introduction of unnecessary features. We have, consequently, a right to test carefully the assertions of those who bid us accept utility on trust as the all-governing principle of even such essentially useful structures as bridges.

I have chosen the latter class of buildings to illustrate my meaning, because in them such a principle may fairly claim to be predominant; but even in matters which more naturally come within the definition of architecture as a fine art utility is not found to be necessarily an opponent. . . . .

The age of no-architecture in this country, now happily brought to an end, was fertile in shams and concealed construction. The great engineering works of the present day have at least taught architects that they need not be afraid of exhibiting structural details, although it is unfortunately too obvious that such works have not solved the problem of uniting truth with beauty in such a manner as to become artistic delights, as well as scientific triumphs.

There is plenty of scope for the architect in uniting art with utility. We are told sometimes that utility is so far to rule, that every portion of a design should declare its use, whether such use be noble or ignoble, and however the architectural composition, as a whole, may be affected by such partial treatment. We see daily, in consequence, designs of shreds and patches, which, while affecting to make a god of utility, are often in reality not convenient, while they offend the sense of fitness, which demands dignity and elegance as well as convenience in architectural work.

Nor is this the only evil. In paying tithe of mint, anise, and cummin, the weightier matters of the law are too often neglected. Young architects are apt sometimes to act as if it were a triumph of their art to throw down at random parts of a composition, and accept the result. Irregularity is supposed of necessity to give picturesqueness, and the external quaintness of a house is more studied than either the purse or the comfort of its inmates. This, I need hardly say, is a complete inversion of the principle that our art is based upon utility.

To indulge in such tastes is doubtless far easier than to study carefully the requirements of each building, and consider how they can be artistically complied with. This, however, and no less, is the duty of the architect, and only by performing it thoroughly can he achieve complete success. It is useless for a house, for example, to be delightful to the architect, with gables, turrets, and dormers, if the owner declares that to such matters have been sacrificed warmth, comfort, and ventilation. A design of architecture must always be a compromise, and when one class of considerations obtrude themselves with an exaggerated prominency, the others become more or less sacrificed. . . . .

Architecture, of course, is not all utility, and has in her higher character, as we saw in the last lecture, claims on the consideration of society at large. She is bound to assert her place in regard to the public buildings of the country. In this position, at any rate, she can tolerate no derogation from her position as one of the fine arts. It is her province to erect temples of worship and to dignify cities. In humbler works it is her privilege to carry a feeling for art into the homes of the thousands. In fine, she has to unite beauty with utility, and apply the result to the service of men. It should not surely be said of our art that all the good is over. We have the past for instruction, and not for blind imitation. The powers of man are not diminished since the days of the artistic giants of antiquity, while science has conferred upon us privileges of which they little dreamt. Architecture, therefore, pursuing her mission, and supported by Art on the one hand and by Science on the other, may, if true to herself, still look hopefully forward; for, in the language of our President's address, on a recent occasion,[1] in which he sums up the argument in better words than I could use, —

"Certain it is that architects may look with a proud confidence

[1] Discourse delivered to the students of the Royal Academy, on the distribution of the prizes, December 10, 1879, by Sir Frederick Leighton, P. R. A.

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into the future, for they practise an art raised on an immovable basis of science, clothing itself in forms of abstract beauty, enriched by the coöperation of sculpture, and yet made lovelier, when it chooses, by the charms of color. And though no man shall invent a new style,— as the foolish phrase goes, — for styles are not invented, but evolved, I do not doubt but that in due time the tentative and eclectic phase through which architecture seems now to be passing will give place to more homogeneous development, in which, whilst the individuality of the artist finds free room to assert itself, the requirements, physical and intellectual, of each particular country will achieve a more definite and distinctive expression."

THE LATE CONSTANTINE BRUMIDI.

Brumidi was born in the city of Rome, where he studied, surrounded by an atmosphere of art and with the examples of the noblest works of the greatest masters constantly before him. He attained considerable celebrity in Rome, and such was his standing as an artist that he was favored with a commission to paint a portrait of Pio Nono, and was also employed for a long time in repairing the frescoes of the celebrated Logge di Raffaello in the Vatican, which were painted under the direction of Raphael by Giulio Romano and his other principal scholars. He came to this country in 1848, and proceeded to the city of Mexico, where he painted altar-pieces for churches, as he did also in New York and other cities after his return. The largest of these is that of St. Stephen's, in New York, which is seventy feet in height.

Coming under the notice of Mr. Walter and General Meigs, who were in charge of the Capitol Extension, then just completed, he was employed to decorate the room of the Committee on Agriculture of the House of Representatives. This was finished in 1855, and gained him much celebrity. It was considered at that time, as far as mere execution was concerned, to have been the best example of mural decoration in the country, and to-day, on account of the excellence of his method of applying the colors, they are as pure and brilliant as when first laid on. While Signor Brumidi's remarkable designs have caused much grief to the judicious, and infinite mirth to the irreverent, he was certainly a master of the difficult process of fresco-painting, which is the most durable known to art. His work in this room, so far as drawing and coloring are concerned, was much more satisfactory from an artistic standpoint than his later work, especially that upon the rotunda on which he was engaged at the time of his death.

Since 1855, Brumidi had been almost constantly at work upon the interior of the Capitol. He decorated with his brush a number of the apartments in the building, and also accomplished the wonderful work of covering the walls of the corridors in the basement story of the Senate wing with mural ornaments of arabesque, combined with representations of the birds, fruits, and flowers of America. The most colossal work executed by him in the Capitol is that of the allegorical painting on the canopy in the dome. This canopy is composed of a basket-work of interlaced iron rods, covered over with a smooth groundwork of plaster, and is suspended like a huge inverted saucer over the circular aperture in the centre of the vaulted ceiling of the rotunda by a multitude of iron rods attached to the ribs of the outer dome.

For a long time past he had been engaged upon the decoration in fresco of the belt that encircles the wall of the rotunda, nearly a hundred feet above the pavement. The belt is about seven feet in height and two hundred and fifty feet in circumference, and upon it Brumidi was engaged in painting, in imitation of sculpture in alto-relievo, a series of scenes representing important events in the history of the country. The belt is divided into fifteen groups and the subjects chosen are as follows: The Landing of Columbus; Cortez and Montezuma at the Temple of the Sun; Pizarro going to Peru; Burial of De Soto; Captain Smith and Pocahontas; Landing of the Pilgrims; William Penn and the Indians; Colonization of New England; Oglethorpe and the Indian Chief; Battle of Lexington; Declaration of Independence; Surrender of Cornwallis; Battle of the Thames and Death of Tecumseh; Entry of the American Army into the City of Mexico; the Discovery of Gold in California. About half of the circumference of the belt is now finished. The effect is such that the figures stand boldly out from the background, and seem to the eye of the spectator below to be sculptured in stone.

Brumidi's work on the Capitol has been executed in genuine fresco. Painting in fresco is done with earthy or mineral colors mixed or ground in water, which are applied to the surface of plaster or stucco while it is still sufficiently fresh or wet to imbibe and incorporate them with itself. The painting is, in fact, a mosaic in colored plaster. It is comparatively indestructible, and will retain its original color and brilliancy unchanged and undiminished for centuries; in fact, as long as the wall upon which it is painted may remain intact. In the process of execution only as much surface of plaster is prepared at once as can be completely finished while it is still wet. Thus the picture has to progress by piecemeal; each little section must be completed so as to harmonize with the rest of the composition, and there is no possibility of retouching after it is dry. Before the process of actual painting on the walls begins, careful and elaborate studies of color and full-sized cartoons or outline drawings are prepared. From the cartoons the outlines are transferred directly to the plaster by dusting through perforations made along the lines of the drawing, and guided by the color studies, the small section in hand is completed. When it is considered that the colors, when applied to the wet plaster, are much darker than they will finally appear when dry, it will be seen what great difficulties are encountered by the artist. Signor Brumidi, whatever may be said of his designs, understood his process thoroughly, and was enthusiastic and indefatigable at his work. — *Philadelphia Telegraph.*

THE ILLUSTRATIONS.

ST. ANDREW'S HALL, GLASGOW, SCOTLAND.

This important building, which is reproduced from the pages of the *British Architect*, was erected during 1875–76 and 1877, and opened in November of the latter year by Her Royal Highness the Princess Louise and the Marquis of Lorne. It is the property of a public company, and is the outcome of a still larger scheme for providing adequate accommodation of the kind comprised in the building. The sketch plans for the buildings at first proposed were prepared by the late John Cunningham, C. E. and architect, of Liverpool, from whose plans the Philharmonic Hall at Liverpool was erected, and with him was to be associated Mr. Campbell Douglas, of Glasgow, as resident architect. On the original plans being departed from the existing building was designed and carried out under the direction of Messrs. Campbell Douglas & Sellars, F. R. I. B. A. and I. A. In the early stage of the preparation of the plans they had the benefit of Mr. Cunningham's advice, but his death, unfortunately, took place before the work was begun. The buildings comprise the great hall, which is exceeded in size by only two or three halls in the kingdom, — its dimensions are: Extreme length to back of gallery, 180 feet; width, 76 feet; height from floor to ceiling, 56 feet, — and several lesser halls, reception-rooms, etc., on the ground floor. A ball-room suite, including large ball-room, reception-room, and supper-room, etc., is arranged on the upper floor of the front building. The great hall contains a fine organ, erected by Messrs. Lewis & Co., of London.

HOUSE FOR E. H. VAN INGEN, ESQ., WASHINGTON, CONN. MESSRS. POTTER & ROBERTSON, ARCHITECTS, NEW YORK, N. Y.

OPERATIVES' COTTAGE NEAR BOSTON, MASS. MR. T. M. CLARK, ARCHITECT, BOSTON, MASS.

This is one of a number of designs for cottages to be built by a manufacturing company near Boston for the best class of operatives. Contracts just made bring the cost, including cellar, to about $1,500. Some interest is given to the exterior by the employment of several colors in painting, the roof being a dark slate color, while olive green, light brownish red, Indian red, and a greenish yellow are used on the walls and finish.

CORRESPONDENCE.

THE TOWN AND ITS BRIDGES. — THE CHURCHES OF ST. LAWRENCE AND ST. SEBALDUS. — THE GERMAN MUSEUM. — PICTURES. — ALBERT DÜRER'S TOWN WALLS.

Nuremberg.

There is, perhaps, hardly a place to which an architect looks forward with more curiosity than this famous old town. What fantastic fancies are conjured up by its very name! Surely, Doré has drawn his picturesquely weird sentiment from its wonderful gables and fantastic dormers rising steeply above the narrow streets, and its deserted bastions and watchtowers against a sunset sky, ravens, bats, etc., have inspired his blackest woodcuts. Such, at least, were some of my fancies as I neared Nuremberg in the night train, and if my preconceived ideas of the town were not more definite, it was certainly not for want of seeing illustrations and sketches of it. As I jolted in the omnibus up from the station and under a dark gate-tower, I looked out, vainly however, for something mysterious or fantastic. I was driving up a well-lighted, spacious street which would have in no way scandalized the city fathers of an American town. I remembered then to have heard that Nuremberg had been spoiled and modernized out of its picturesqueness. So when I awoke next morning I had calmed down to quite commonplace expectations; still there were certain things I hoped to find in existence, notably the pretty Renaissance dormer with steeple roof which I had copied into my note-book in the earliest days of my architectural studies. Imagine, then, my surprise on first looking out of my window to find that identical dormer on the house opposite. The coincidence was, however, considerably modified when I found any number of similar dormers down the street. My first ramble about the town quite disposed of my preconceived ideas. In the first place, Nuremberg is not in the least like any of Doré's illustrations — I have serious doubts if I ever shall see anything that is like them. On the other hand, its wide, clean streets are not at all modern. By the special Providence which watches over archæology — alas, so rarely! — the main streets originally were made so much wider than those of most mediæval cities that enterprising modern traffic has not found it necessary to widen them. That this is so is proved by houses dating from the sixteenth century standing on either side of them. These houses are generally without gables, — and are thus unlike the majority of old houses nearer the Rhine, — but above their plain, four-storied front is a steep-pitched roof from which project the well-known dormers. Of the latter there are two chief varieties: one a double window with a steep roof curving up into a miniature steeple, and the other having a single window

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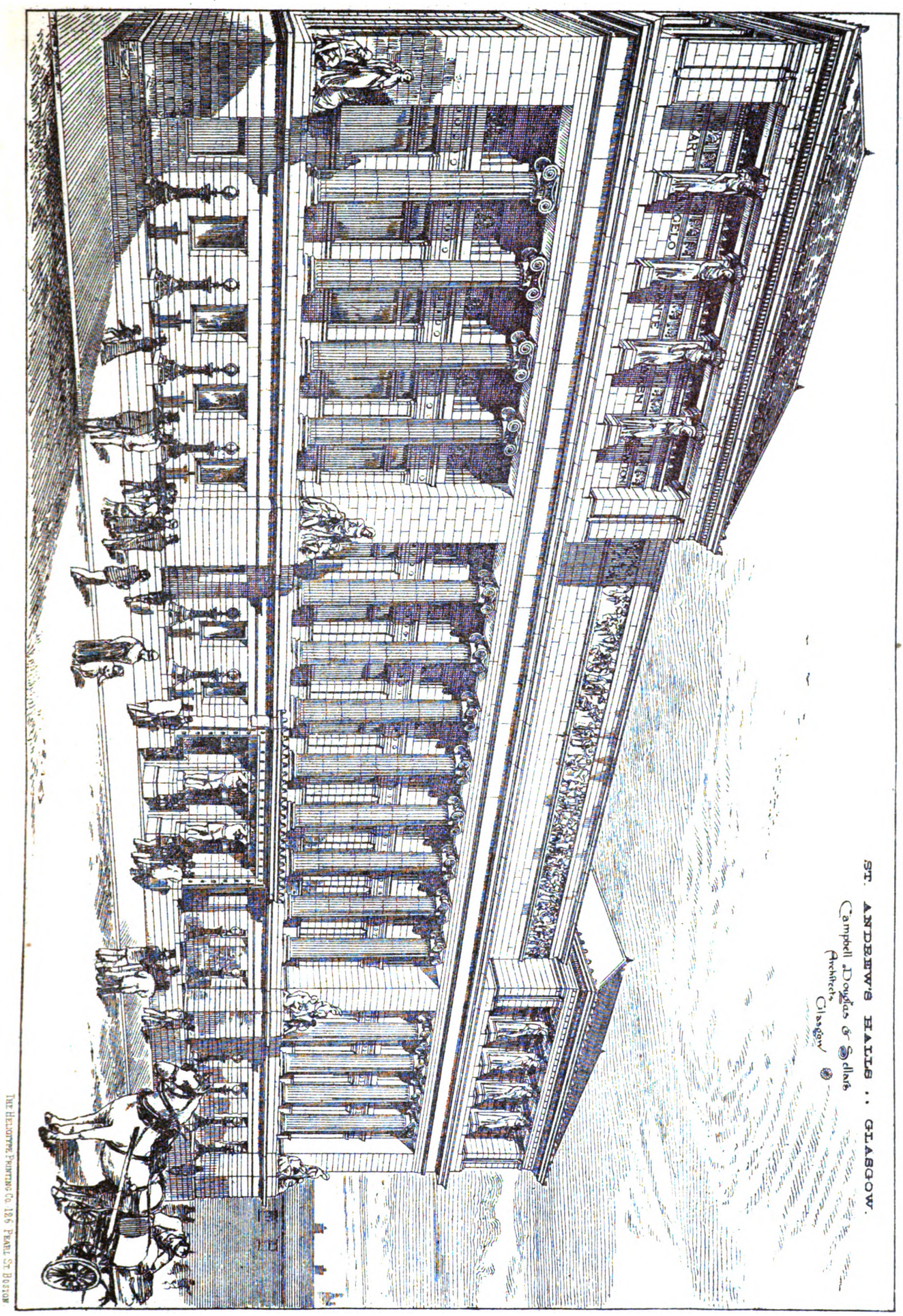

ST. ANDREW'S HALLS .. GLASGOW.

Campbell Douglas & Sellars
Architects
Glasgow

THE HELIOTYPE PRINTING CO. 186 PEARL ST. BOSTON

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whose roof is carried out in front of it with an octagonal hood sheltering a pulley. Both kinds have a delicate Renaissance order supported upon consoles projecting from the parapet. Occasionally, however, the sky line is broken by a high stone gable, whose profile and curves recall the Flemish architecture.

As I strolled along I found the street rapidly descending and I was soon gladdened by the sight of a bridge. Any one familiar with European towns knows that it is by the river — and there are few towns which have not one — that will be found the most picturesque views, and even when there are no especially interesting buildings there will always be bright clothing drying over tumble-down balconies, women washing, etc., all giving sharp lights and shadows to be reflected in the stream. But Nuremberg does not depend upon these humble accidents to interest the artist; its shallow, sluggish stream flows between quaint, time-stained houses, and projecting galleries. Solid old bridges are thrown across it at all angles as it winds capriciously through the town. Twice it is divided by islands whose crowded houses topple over the water, and in one place an old fortified bridge wades across to a tower in the middle of the current, but the stream works its way along, turning a dozen mill-wheels, and at last spreads calmly out before issuing from the town under one of the grandest bridges of the Middle Ages. Its vast construction lies like a fortress across the river, its large end pavilions buttressing the great span of the arch under the central gallery. In these massive walls the single range of ordinary windows look mere pigeon holes. To complete this Cyclopean grandeur, the whole is covered by one va t roof. Connecting with this bridge is a smaller one beyond, carrying a pretty covered gallery on corbels. As if to emphasize the solid dignity of mediæval work the economy of our generation has opened a light suspension bridge beside the great bridge, like a spider's web before a cavern. The contrast is great but not offensive, and as one stands on those wire threads and looks up to the pile above, from which comes the hum of modern manufactures, it is impossible to repress a tribute to the Nurembergers who have thoughtfully found means to reconcile historic glories with modern enterprise. For with all its old-time aspect, Nuremberg is not dead or decaying, but is rapidly regaining the prosperity which gave it such importance in the sixteenth century, and is to-day the most enterprising and growing city of South Germany. Yonder it was found necessary to replace a wooden mill by a new brick one, and it has been simply and cleverly done; its timber framing harmonizes with the surrounding buildings, and a square tower — apparently for some part of the machinery — gives it a claim of its own to the picturesque. Throughout the town I noticed the same consideration for old buildings and an effort to reconcile the new ones with them. There is some talk of taking down the walls of the town, but judging by the spirit thus far shown, I doubt if there will be a wholesale destruction of them, but rather more frequent openings pierced to facilitate communications. At any rate the example of what has already been done points sharply to a fact which needs to be clearly expressed. It is not modern necessities which have swept away priceless ancient monuments, but the brutal nineteenth-century contempt of everything which does not minister directly to sordid gain. In England it is fashionable to affect archæological enthusiasm, and lately a magnificent burst of righteous indignation protested against a wholesale destruction of an Italian building — sheer presumption in its dual sense; but not long before few and feeble were the voices raised to preserve from total destruction one of their most picturesque and famous old monuments. In view of the expensive site, it was folly to think of widening the street on either side of Temple Bar! So England quietly accepted one of the most flagrant cases of wanton destruction. All honor then to the worthy Nurembergers who have set such an excellent example.

After a glance under the great arch I have described, through to the pretty public gardens by the river's bank beyond, turn from this quiet scene and look up the river to the bewildering mass of houses and steep roofs which rise pell-mell one above the other up to the sharp spire of St. Lawrence on the ridge above. Especially at sunset the contrast is very striking and illustrates the naive simplicity and breadth of effect which is constantly contrasted in mediæval life with minute details.

There is an excellent example of this in the large market place. On one side is the Roman Catholic Cathedral, built in the fourteenth century, which, though only ranking third in importance among the churches of the town, has a rich and curious façade. Its gable is screened with elaborate arcades and is carried up into a little open-roofed turret or pinnacle. Under this there is a florid two-storied porch, the second story slightly in retreat with its angles cut off for windows, which gives occasions for a device, common in Gothic octagonal buttresses, but rare on this scale, of curving the gable back to reach the polygon sides. Across the square is a celebrated Gothic fountain rising in an elaborate spire of four divisions or stories of arches, pinnacles, and statues. The design is light and elegant and of marvellous workmanship. To contrast with these two examples of detailed design one whole side of the square is occupied by a great building whose immense surface of plain wall, lifting its parapet above the dormers of the five-storied adjoining houses, is pierced by only three ranges of widely spaced windows. It is most imposing. I never went through that square without mentally taking off my hat before its grand simplicity. It is not the least of the difficulties of the architects of to-day that they must provide an amount of light for the interiors unknown and unsought in preceding centuries, and which thus permitted those magnificent wall-surfaces, sharply accentuated with rare openings, which will be found to be a most important factor in all truly monumental architecture, whether Egyptian or Grecian temple, Arabian mosque, Byzantine church, or Florentine palace. The partial elimination in churches of this factor forced the Gothic architects to prodigious efforts to supply its place by ingenious and costly devices. The question arises whether these devices can help us to build monumentally, or whether we have another problem and a new solution before us.

The two finest churches in Nuremberg are those of St. Lawrence and St. Sebaldus, both of which are Protestant, as are most of the churches, for out of 91,000 inhabitants there are only 9,400 Roman Catholics. St. Lawrence, standing on high ground near the entrance from the railroad station, is the most conspicuous as well as the largest. Between its two towers is an elaborate open-work gable and under this a beautiful and original rose. The rich window itself is set back on the inner side of the hall, while the outer side is elaborately carved around it in a circular band with an open cut fringe within; this casts a striking shadow upon the window itself and is a beautiful device which I am surprised to find was so rarely adopted. The porch is shallow and minutely carved in bas-reliefs, but with less of the dryness habitually found in German florid sculpture. The church was building from the end of the thirteenth century to the end of the fifteenth, and it is within that the earliest work is visible, where slender clustered pilasters between the lancet nave arches carry the shafts of the quadripartite vaulting. A peculiarity is that there is no triforium, but the lofty space above the arches into the aisles up to the clerestory is left quite bare. Chapels are added to the aisles between the thickness of the buttresses. The choir is later and has in the crown of its vaulting an elaborate net-work of ribs. In the choir near the transept is a charming little sacristy, and an elegant stone stair turret against the hall leads to a second story.

The most famous work in the church is a *tour de force* in the lace-like carving of a very lofty pinnacle above a sort of tabernacle. Except this the whole church is remarkably free from what I have previously called German dryness. The eleven windows of the choir are filled with beautiful glass, one, with the genealogy of Christ, having a lovely silvery tone. As a rule the designs are cut up into small panels with figures, and in one case these panels are set in a dark neutral tinted ground chased over with delicate arabesques. But color is not confined to the windows, as the dark stone walls are almost hidden in places behind the painted coats-of-arms of noble families, which are hung capriciously about. They are anything but ecclesiastical, yet are to be found in all the churches in this country, and certainly give animation to the walls, which are further garnished with statues, pictures, and crucifixes. Before the high altar hang carved wood statues of the Virgin and an announcing angel fastened within an oval hoop. Not far beyond, from a bar across the choir, rises a wrought-iron crucifix with elaborate leaves and branches sprouting from it. All this, as may be imagined, gives a curious mediæval picturesqueness, appealing more directly to the bric-a-brac collector and painter than to the architect, yet fascinating to the latter, perhaps, none the less. St. Sebaldus is rather smaller than St. Lawrence and dates from the thirteenth century. It has two choirs like the Rhine churches, but otherwise has no similarity with them. Between the exterior buttresses of the apse are some groups of figures, finely sculptured by Adam Krafft (1492), who also worked upon the rich portals. Within there are many of the same characteristics as at St. Lawrence, but among the pictures hung against the pillars are some fine works. A burial of Christ, attributed to Albert Dürer, is full of tender sentiment. The tomb of St. Sebaldus is one of the most patient works of the laborious sixteenth century. The celebrated Peter Vischer wrought upon it, with his five sons, thirteen years! It consists of an elaborate bronze canopy with some twenty-five statuettes, and an endless number of bas-reliefs and grotesque ornaments. The wonder of this patient elaboration is what considerations finally convinced the artists that they had finished their work. The windows of the choir have fine old glass, but very dark — far too dark for true architectural effect; the prevailing tones are dark green and reds, with a rare use of blue. A powerful effect might be produced by a graduation from such dark windows in a nave to brilliant ones in the choir, or *vice versa*, but I do not remember to have seen this systematically tried.

I have never seen a more charming arrangement of a museum than that of the German Museum founded here in 1852. If anything was wanting to prove the good taste of these people, of which I have spoken above, their adaptation of the old Carthusian monastery of the fourteenth century would be conclusive evidence. Around a large cloistered court are arranged in some twenty-six halls, chapels, and galleries a precious Gothic collection, to which additional charm is given by the quaint old-fashioned arrangements. The large pictures and pieces of furniture are in the halls, and the small objects — such as a fine collection of locks, for the iron-work here is celebrated — in chambers of the monastery which have been judiciously painted and restored. The open-timber roofs and wooden vaults of the chapels and halls have been completely, and perhaps rather complicatedly, restored also. There is a large collection of early printing and wood-cuts, among the latter, of course, many an Albert Dürer, and some by Holbein. It is noticeable that while his wood-cuts have such sharp accentuation with black dots and heavy lines, his pictures have

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an exaggerated smoothness and want of emphasis. His celebrated portrait of Maximilian First and others are to be seen here. There is also here a fresco by Kaulbach which, with the exception of one — amongst several poor ones — in the New Museum of Berlin, is the best I have seen by him. The dramatic subject of the opening of the tomb of Charlemagne by the Emperor Otho III., he has treated with great power.

There are two other picture galleries; the most important one, the one in the St. Moritz Chapel, is a fine collection of the German and Flemish schools. I have no space to speak of the well-known pictures here by Holbein the elder, and of Dürer's still more celebrated Mater Dolorosa, but I must mention several very beautiful Madonnas and Saints by Hans Burgkmair (1473–1531), whose lovely and richly-enamelled color and truth of expression I had never before realized. His low, rich tones seem to me to have influenced the leaders of the present Munich school.

To reach the other pictures you must climb the other slope of the town, passing several fine old houses with high carved gables and projecting oriel windows, up to the castle which overhangs the city to the north. Its great towers and red-tiled roofs give a grand outline against the sky. Passing under a lofty round tower, a landmark for miles around, one enters a pretty, irregular court, surrounded with wooden balconies. In the centre is one of those 800 year old yew trees, to which one is respectfully presented in various chosen spots of Europe. Beside superb views over the fantastic red roofs of the city to the fertile plains round about it, there is little of special interest to be seen. The castle, founded in 1024, was last restored in 1856. Among the pictures preserved in the chapel is Dürer's Path to the Cross, to me his most impressive work. This is a masterly conception, and a fervent, strenuous, and, at last, successful effort to express it. The whole sentiment of the picture is most devout and tender, and it is impossible to connect it with the bold, almost brutal, hand which chipped out those coarse wood-cuts. His large wooden house with its big roof, so often sketched, is carefully preserved, and stands just below the castle.

Before closing this imperfect sketch of a town probably the most sketched in Europe, and yet never exhausted, let us hurry down from the castle and pass out under the vast outlying vault, or rather tunnel, which connects with the drawbridge of the moat. The latter is very wide and deep, — in fact, a small valley in which are cottages and gardens. At the angles of the bastions, which enfilade the drawbridge, are enormous and boldly-carved shields with coats of arms. The famous fortifications of Nuremberg date from the fourteenth and fifteenth centuries, and surround the city with a double line of defence, — the inner walls, and at a short distance, a counterscarp and moat. The latter were erected to meet the new exigencies of fire-arms, and have the germs of Vauban's three systems, the foundation of modern defences. Following the walled rampart or *boulevard*, one soon comes upon one of the huge round towers which guard the four principal gates of the city. A fifth, of like design, but less massive, defends the castle entrance. Nothing can be grander than these massive towers. The Romans never reached in their military works a grander result than is here shown. Machicolations and corbelling, with all their perfected architecture, were ruthlessly swept away by the invention of gunpowder, and the architect, deprived of all previous traditions, was obliged suddenly to create a new style, — a problem we of the nineteenth century can appreciate. Sincerity of purpose and a disciplined art produced a noble result. These towers are almost without openings, and were defended from the parapet by cannon served behind wooden embrasures. Over all is a flat tile roof with a steep pitched lantern or observatory in the middle. There is perfect unity of conception between the mouldings supporting the parapet and solid cylindrical mass which they crown, and which is more than twenty metres in diameter. A single robust curve swells out to support this parapet, and below is a semicircular moulding and fillet which is again repeated a short distance lower down as an astragal. Except a rusticated basement this is all there is to break the wall-surface, and yet a great work of art is before us, by the hand of a great master. The same hand which dashed off those brilliant wood-cuts, and which tenderly lingered over The Path to the Cross, designed these grand towers and their adjoining gates. Albert Dürer as painter, engraver, and architect may claim a threefold fame from succeeding centuries; but surely during lifetime his greatest glory must have been to have so magnificently fortified his native city. I would gladly describe these picturesque old walls and towers in detail, but as I could, at best, but tantalize the curiosity of those who have not seen them, I had best close with the wish that they may some day. R.

OLD AND NEW BUILDINGS. — THE HOUSE OF W. CLARK, ESQ.

NEWARK, N. J.

Apart from dingy brick factories and high smoke-stacks, Newark is a wooden city, with all that the name implies, of cheap ornament and poor construction. The exceptions consist of a liberal scattering of solid stone churches with honest spires of masonry. There are houses of stone and brick, the luxuries of a few, but even among these, evidences of much architectural training are not frequently apparent. For the most part, though ranking among the chief manufacturing cities of the country, Newark cannot be charged with lavishing art upon her exterior. From names of Newark families one may conclude that the colonial stock is still well represented here, but it must be a cause of regret that they have so generally lost the building traditions of their ancestors, whose mansions have doffed their old garb, and have not even been allowed to retain the ornament of a meek and quiet spirit.

As one strolls up and down he will discover in odd places some relics of a better period. Among the churches "Old Trinity" is conspicuous, almost the only record left, except the venerable trees, in a locality that must once have abounded in fine examples of colonial work. This church is said to be of ante-revolutionary date. If so, it carries its age with vigor. It exhibits splendid masonry in small squared stones. The steeple, set upon a stone tower, is of wood and painted white in the fashion of those days. It is of good proportion, and simple in construction, — not "churchly" as the phrase goes now, but with an air of old-fashioned godliness nevertheless. The Egyptian front of the old court-house on the side-hill near Market Street is another fragment of a better period; but "Cockloft Hall," made memorable by Washington Irving, and notable as the residence of many men of distinguished names, has lost its identity under the spirit of improvement. The old Kearney Mansion on Belleville Avenue, among its contemporary trees, gray, broad-breasted, and hospitable, with excellent proportions, chaste mouldings, and a suggestion of wide fireplaces under quaint wood mantels, is one of the notable relics of colonial building. The Rectory of the House of Prayer tranquilly rests under a gambrel roof, but when one looks for the ancient meeting-house, its mate, he sees only a handsome modern church.

Of new public buildings the Newark Mutual Benefit Life Insurance Company owns and occupies an imposing one of massive proportions, which is conspicuous as a step beyond the sterility which surrounds it. Nearly opposite is another, less self-asserting and of chaster style, wearing an air of refined feeling in agreeable contrast with some near examples where the idle use of decoration is called architecture.

Among recent domestic work the mansion of Mr. Hopper on High Street is most quoted. The least that can be said of it is that it is a novelty. The material of the outer walls is the green serpentine stone from Pennsylvania. The architect has treated it in the only way it can be successfully employed, as a villa style, for which the site affords the opportunity. The lot is spacious and the mansion broad, right, left, and rear, rising into a tower on the east. It is much admired by some and would attract attention if only for the rarity of the material. Lower down, on High Street, is Mr. Rankin's brick house, better than is often seen in this city. Its architect had ideas, and has expressed them with true refinement; whilst there is no wanton destruction of straight lines, there is an agreeable variety of form — the chimneys are strongly emphasized — the roof windows obviously where they are most needed. The entire grouping is well balanced· the color sober but energetic.

One of the chief examples of a new departure in domestic architecture, as regards both construction and architectural effect, is the house now building for Mr. Wm. Clark. Its site is exceptionally fine, with difficulties to be overcome. The problem was to crown a high hill with a homelike structure, not castle and not public building, but immense in size. The subject has been well handled, as the result will prove when the roof is completed with its all important chimneys and dormers. The chimneys in particular are vigorous features in the massing of roof effects. The position on Mt. Prospect Avenue is the finest that could be chosen. The view is vast and of peculiar beauty. On the east, the natural front, is a bird's-eye view of the entire city of Newark, which lies in the valley below, divided into East Newark and Newark proper by the Passaic River. At the lighting of the lamps the scene is magnificent. The smoke and blaze of many factories, together with the crossing lines of street lamps, repeated for miles, present an illuminated picture of ideal brilliancy. Over beyond Newark, rising among forest trees, are the towers and gables of the mansion of the late General Kearney, and still beyond, across Newark Bay, nine or ten miles away, lies the ocean, narrowing into New York Bay, and at its head the city of New York, where on a clear day the piers of the Brooklyn bridge are plainly visible.

The entrance to the mansion is bravely put away to the south, not to intrude upon this field of vision. To the average client the obvious front would have been on Mt. Prospect Avenue, where he would have insisted upon asserting himself — and the average architect would have spent himself in carved capitals and pediments.

In style the Clark house may be called Baronial. Mainly the plan, as indicated by the roof lines, is roughly a figure ┼┘, the exterior angles being filled by square, level-roofed attachments of variable heights filling out the ground plan to the dimension and form of about one hundred feet square, and affording a pyramidal grouping. The roof is a gable one with all ridges on the same line, and sloping down to the same plate level. The materials are brick and stone; the former a dark cherry-red from Philadelphia, and the latter a rich blue of close texture from near the slate regions of Pennsylvania. The quoins, the parapet copings, and chimneys are of stone. Dentil string-courses of rich design mark the height of the second and third stories.

The plan of the house being square the projecting portions are in squares. A square veranda fills an angle on the northeast corner,

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its flat roof being supported on clustered square pilasters of stone, disengaged, and resting on a brick pedestal and bound near the top with a single stone band. Its roof is surmounted by a stone parapet from three to four feet high and pierced in squares of well-judged depth to produce rich effects of shadow.

Not to be too rigidly square, however, a mullioned bay-window on the east, opening from the library, is in the form of a semicircle, and springing from a soberly sculptured corbel, in a return near the level of the top of this window, is an oriel of stone which reaches to the top of the third story, and thence carried up terminates in a stone finial done in quiet carving. The stone parapet surmounting the veranda is repeated at the summit of the semicircular window, and again at the square two-storied mullioned bay on the north, and a two-storied observatory on the east.

A marked characteristic of the design is its equilibrium. The absence of superfluous ornament is conspicuous. It cannot be doubted, however, that the present tone of the structure is severe and cold. Its lines are sometimes rigid, and it is open at least to the criticism of too great an economy of decoration; as if the architect in striving to avoid the vice of intemperance in ornament had fallen into the opposite sin of asceticism.

The entrance porch on the south is a model of subdued effort towards decorative freedom. It occupies the first story of a projecting wing. It has four columns of two feet diameter, in three colors: the pedestal of Rhode Island gray granite tooled, the lower portion of the shaft of red polished granite, and the upper portion and capital of the blue stone employed in the building. On the front the entablature is massive — the architrave, a solid blue stone block thirteen feet span, bearing a plain frieze. Surmounting all there is a balustrade of rich design enclosing a balcony from a window of the second story. The corner posts of the balustrade continued downwards form a portion of the decorative work of the capital. On either side the entablature is pierced with half-wheel rayed openings. The whole effect of the porch is a nearer approach to levity than is evident elsewhere. But the architect bursts into a frolicsome mood at the summit of his massive stone dormers, where he has placed two stone finials suggesting a cross between an Indian war club and a champagne bottle.

The walls are of brick and stone laid up in cement mortar, with a strip of lead at each joint of stone. The interior walls are all of brick, and the rooms so planned that the division walls, carried from cellar foundation upwards, meet the three main divisions of the roof so as to constitute their proper bearings. Where necessary breaks occur they are spanned by stout iron girders upon which the wall is continued.

Unexpected difficulties were met in excavating for the foundation. In places it was necessary to dig for a firm bottom to the depth of fifteen or twenty feet. These pits were filled with concrete of cement and stone. The enclosing cellar wall is of native stone to the ground level, two feet ten inches in thickness, handsomely jointed and tooled on its interior face, and outside coated with a layer of cement one inch thick. The footing-course under the partition walls is of proportionate depth, and two feet four inches thick, carrying the brick wall, sixteen inches thick, to the roof. Much outside criticism is indulged on what is termed the useless expenditure for a mere dwelling-house, the costly foundations being a subject of especial remark. G.

MR. RUSKIN ON ST. MARK'S.

MY friends have expressed much surprise at my absence from the public meetings called in defence of St. Mark's. They cannot, however, be too clearly certified that I am now entirely unable to take part in exciting business, or even, without grave danger, to allow my mind to dwell on the subjects which, having once been dearest to it, are now the sources of acutest pain. The illness which all but killed me two years ago was not brought on by overwork, but by grief at the course of public affairs in England, and of affairs, public and private alike, in Venice; the distress of many an old and deeply regarded friend there among the humbler classes of the city being as necessary a consequence of the modern system of centralization as the destruction of her ancient civil and religious buildings.

How far forces of this national momentum may be arrested by protest, or mollified by petition, I know not. What in either kind I have felt myself able to do has been done two years since, in conjunction with one of the few remaining representatives of the old Venetian noblesse. All that now remains for me is to use what time may be yet granted for such record as hand and heart can make of the most precious building in Europe, standing yet in the eyes of men and the sunshine of heaven.

The drawing of the first two arches of the west front, now under threat of restoration, which, as an honorary member of the Old Water-Color Society, I have the privilege of exhibiting in its rooms this year, shows with sufficient accuracy the actual state of the building, and the peculiar qualities of its architecture. The principles of that architecture are analyzed at length in the second volume of the Stones of Venice, and the whole façade described there with the best care I could, in hope of directing the attention of English architects to the forms of Greek sculpture which enrich it. The words have been occasionally read for the sound of them; and, perhaps, when the building is destroyed, may be some day, with amazement, perceived to have been true.

In the mean time, the drawing just referred to, every touch of it made from the building, and left as the color dried in the spring mornings of 1877, will make clear some of the points chiefly insisted on in the Stones of Venice, and which are of yet more importance now. Of these, the first and main ones are the exquisite delicacy of the work and perfection of its preservation to this time. It seems to me that the English visitor never realizes thoroughly what it is that he looks at in the St. Mark's porches. Its glittering confusion in a style unexampled, its bright colors, its mingled marbles, produce on him no real impression of age, and its diminutive size scarcely any of grandeur. It looks to him almost like a stage scene, got up solidly for some sudden festa. No mere guide-book's passing assertion of date, this century or the other, can in the least make him even conceive, and far less feel, that he is actually standing before the very shafts and stones that were set on their foundations here while Harold the Saxon stood by the grave of the Confessor under the fresh-raised vaults of the first Norman Westminster Abbey, of which now a single arch only remains standing. He cannot, by any effort, imagine that those exquisite and lace-like sculptures of twined acanthus — every leaf-edge as sharp and fine as if they were green weeds fresh springing in the dew, by the Pandroseion — were, indeed, cut and finished to their perfect grace while the Norman axes were hewing out rough zigzags and dentils round the aisles of Durham and Lindisfarne. Or nearer, in what is left of our own Canterbury — it is but an hour's journey in pleasant Kent — you may compare, almost as if you looked from one to the other, the grim grotesque of the block capitals in the crypt with the foliage of these flexible ones, and with their marble doves, scarcely distinguishable from the living birds that nestle between them. Or, going down two centuries (for the fillings of the portico arches were not completed till after 1204), what thirteenth-century work among our gray limestone walls can be thought of as wrought in the same hour with that wreath of intertwined white marble, relieved by gold, of which the tenderest and sharpest lines of the pencil cannot finely enough express the surfaces and undulations? For, indeed, without and within, St. Mark's is not, in the real nature of it, a piece of architecture, but a jewelled casket and painted reliquary, chief of the treasures in what were once the world's treasuries of sacred things, the kingdoms of Christendom.

A jewelled casket, every jewel of which was itself sacred. Not a slab of it, nor a shaft, but has been brought from the churches descendants of the great Seven of Asia, or from the Christian-Greek of Corinth, Crete, and Thrace, or the Christian-Israelite in Palestine, — the central archivolt copied from that of the Church of the Holy Sepulchre, and the opposing lions or phœnixes of its sculptures from the treasury of Atreus and the citadel of Tyre.

Thus, beyond all measure of value as a treasury of art, it is also, beyond all other volumes, venerable as a codex of religion. Just as the white foliage and birds on their golden ground are descendants, in direct line, from the ivory and gold of Phidias, so the Greek pictures and inscriptions, whether in mosaic or sculpture, throughout the building, record the unbroken unity of spiritual influence from the Father of light — or the races whose own poets had said, "We also are his offspring" — down to the day when all their gods, not slain, but changed into new creatures, became the types to them of the mightier Christian spirits; and Perseus became St. George, and Mars St. Michael, and Athena the Madonna, and Zeus their revealed Father in heaven.

In all the history of human mind there is nothing so wonderful, nothing so eventful, as this spiritual change. So inextricably is it interwoven with the most divine, the most distant threads of human thought and effort, that while none of the thoughts of St. Paul or the visions of St. John can be understood without our understanding first the imagery familiar to the pagan worship of the Greeks, on the other hand no understanding of the real purport of Greek religion can be securely reached without watching the translations of its myths into the message of Christianity.

Both by the natural temper of my mind, and by the labor of forty years given to this subject in its practical issues on the present state of Christendom, I have become in some measure able both to show and to interpret these most precious sculptures; and my health has been so far given back to me, that if I am at this moment aided, it will, so far as I can judge, be easily possible for me to complete the work so long in preparation. There will yet, I doubt not, be time to obtain perfect record of all that is to be destroyed. I have entirely honest and able draughtsmen at my command. My own resignation of my Oxford professorship has given me leisure, and all that I want from the antiquarian sympathy of England is so much instant help as may permit me, while yet in available vigor of body and mind, to get the records made under my own overseership, and registered for sufficient and true. The casts and drawings which I mean to have made will be preserved in a consistent series in my museum at Sheffield, where I have freehold ground enough to build a perfectly-lighted gallery for their reception. I have used the words "I want," as if praying this thing for myself. It is not so. If only some other person could and would undertake all this, Heaven knows how gladly I would leave the task to him. But there is no one else at present able to do it. If not now by me, it can never be done more. And so I leave it to the reader's grace. J. RUSKIN.

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THE STOPPAGE OF FIRES IN WALLS AND FLOORS.

To the Editor of the American Architect:

Dear Sir, — I am very much interested in the question of the possibility of building houses more solidly and rendering them at least comparatively fire-proof. We are ourselves on the point of building a country house, under the supervision of competent and well-known architects, but I have been unable to awaken in them the interest I feel in solid and at least comparatively fire-proof construction.

It seems to me that hollow spaces between the lath and plaster and outside walls form a radically wrong system of construction. Also hollow spaces in partitions, and between floors and the ceilings under are wrong, affording a galloping ground for rats, and a chimney draught for any fire that may be started.

A builder told me yesterday that it is possible to fill up these spaces with sand.

Will you kindly let me know by letter, or through the columns of your paper, of which (though a lay woman) I am a constant reader, what you think of the merits of such a method. It would not be very expensive, I think, as building a separate brick wall from cellar to roof would be. I am yours very truly,

Subscriber.

[We cannot greatly praise the idea of filling the frame of a house with sand. The weight of sand for an ordinary house would be some hundreds of tons, and would amount to a hundred pounds per square foot on the floors alone, more weight than it would be wise to trust permanently on the floors of a common house, and enough to break down a great many. While the sand was dry it would be continually jarring out of many cracks; when water leaked in it would absorb a great quantity, adding greatly to its weight, and bringing danger of dampness and rot. We must defer, for the moment, entering upon the question of fire-proofing. Perhaps some of our readers will help us out. — Eds. American Architect.]

PUBLICATIONS RECEIVED.

A Book on Building, Civil and Ecclesiastical, including Church Restoration with the Theory of Domes and the Great Pyramid, and Discussions of many Churches and other Great Buildings. By Sir Edmund Beckett, Bart., LL. D., Q. C., F. R. A. S., Chancellor and Vicar General of York. Second edition, enlarged. London: Crosby, Lockwood & Co. 1880.

Plumbing. A Text-Book to the Practice of the Art or Craft of the Plumber, with Supplementary Chapters upon House Drainage embodying the latest Improvements. By William Paton Buchan, Sanitary Engineer and Practical Plumber; Member of the Sanitary and Social Economy Section of the Philosophical Society of Glasgow, and Fellow of the Royal Scottish Society of Arts. Second edition, revised and much enlarged, with three hundred illustrations. London: Crosby, Lockwood & Co. 1880.

NOTES AND CLIPPINGS.

The Cathedral at Florence. — The front of the left wing of the façade of the Florence Cathedral has just been again covered with matting after having been exposed to the admiration of the Florentines for a fortnight. About one fifth of the façade is now completed, at a cost of rather more than 300,000 francs or £12,000, entirely collected by voluntary contributions. The work has been intrusted to the architect De Fabris, who has been ably assisted by a young architect of great promise, Signor Louis del Moro, who has bestowed his utmost care and attention on the work, which has given general satisfaction, and which is undoubtedly the most important in an artistic light which has been executed in Florence during the present century. The new façade harmonizes with the rest of the edifice, commenced at the time of the revival of art from the design of Arnolfo, which was afterward modified by the change introduced by Brunelleschi. Several figures in marble are placed over the entrance door; those sculptured by the talented Professor Paganucci are wonderful productions of art, they represent angels and the Apostles and greatly add to the beauty of the entire work. According to the historian Villani, the Florentines had at an early period determined to erect in their city a monument which should surpass all that had preceded it, and on Christmas Day, 1298, the foundations of the cathedral were laid, to which the name of "Santa Maria del Fiore" was then given. Between the period of the commencement of the edifice and that in which its completion was intrusted to Brunelleschi, many architects of eminence were employed in carrying on the works, such as Giotto, Gaddi, and Orgagna. The façade subsisted till the sixteenth century, and was destroyed in 1588 by Benedetto Uguccioni for the purpose of reërecting it in the modern style. In 1636 another façade was begun, but the works were soon suspended and remained so till within three years. A subscription was got up during the time of the late government, at the head of which was the name of the Grand Duke, for restoring the façade, but no further steps were taken. — *Correspondence of the Geneva Continent.*

Sanitary Condition of Memphis. — The Memphis *Avalanche* is dissatisfied with the manner in which the city offal is disposed of. For several months it has been dumped in the river below the city, at a point where it was supposed the current of the Mississippi would sweep it away. Instead of that it has formed a bank close to the bank of the river, and though covered up now by high water, it will be laid bare and exposed to the hot sun when the summer stage of low water comes on. This removal of the city offal has been the principal precaution taken to improve the health of the city, and if it has failed there is very little chance of Memphis escaping another yellow fever infliction.

"If I were Prefect of the Seine." — In the number of *Paris Murcie*, a journal produced with the aid of all the most eminent artists of France, and the large proceeds of which have been devoted to the sufferers by the recent inundations in Spain, M. Garnier, asked to contribute his mite to the general store, expresses his views, above his minute signature, in an article entitled "If I were Prefect of the Seine." "If I were Prefect of the Seine, instead of changing the names of the streets, which at a future time may be easily re-changed, I should make a series of good regulations which would have a chance of lasting a long time. Of your motto, of our motto, if you will, — you make great use of the word 'equality.' Take rather that of 'liberty,' and allow people to build after their fancies. Do not impose on architects maximums of height and projection, but leave to each the right of raising his building according to his convenience, and planting some moucharabis at the corner of his balconies. It will interfere less with the neighbors than the trees of the boulevards, which throw their branches into the windows. Instead of encouraging the fabrication of monotonous cages for lodgers, encourage on the contrary campaniles, gables on the street, marbles, enamel, and mosaic. In every case, if you do not feel you have the power to revive at Paris that desirable picturesqueness which I regret, at least do not follow the example of your predecessors by contributing to sweep away the little which remains. Color as well as form gives charm and movement, and if time gives to our monuments an harmonious *patina*, every pains must be taken to preserve it. Recall therefore that superannuated and deplorable decree that every house shall be scraped and cleaned every ten years, under the pretext that it is hygienic. Why are you not logical, and only carry out such an operation with private buildings? Scrape also Notre Dame while you are about it, and the Sainte Chapelle, and the Baths of Julian, and you will see the beautiful effect these buildings will present when you have taken off their skin. Architects are not pariahs, and they respect the works of their masters quite as much as other artists, and you would see what these latter would say if by prefectoral regulation, the Marriage of Cana, or the Venus de Milo, were scraped. But I am not Prefect of the Seine, and frankly I do not regret it. I prefer to be his friend, Charles Garnier."

A Metallic Watch-Dog. — Most persons are aware that, by introducing a flame of gas into an open tube, whether of metal or of glass, the tube will sound; in fact, we might easily produce singing flames. The sound, of course, differs according to the size of the tube, the force of the flame, etc. Sometimes the sound is like a roar, at others, like a low moan; sometimes high, sometimes low; in fact, the greatest variety of expressions can be produced according to circumstances. But better than this has been found. There are silent speaking-tubes; that is to say, tubes that, under ordinary circumstances, do not utter a sound; but, if a door be opened, a draught is created, then the glass vibrates, and the most startling noises result. A glass of this description has been contrived in which, when a jet of gas burns, the sound of a dog barking is produced should the street-door be opened. Thus may the house be guarded by a mechanical watch-dog!

The Berlinese Sculptors on Competitions. — The Berlin sculptors have presented a memorial to the Ministry of Fine Arts, proposing to regulate the establishment of competitions in such a way that whenever the Government may ask for competitive designs the conditions imposed may not be, as is often the case at present, impracticable for the sculptors to agree to. If the artists in this country should join in proposing to the Government the regulation of the competitions for public monuments, after the manner of those held abroad, some good might result from it. The Berlin sculptors are aggrieved because they think the Ministry of Fine Arts is not sympathetic. American sculptors have all the reason in the world to deplore the utter absence of any national encouragement whatever. — *Boston Advertiser.*

The Demidoff Sale. — All the treasures in Prince Demidoff's villa near Florence are to be sold. Their estimated value is 4,000,000 francs. There are rare sculptures, masterpieces of the Dutch school, some of which cost from $30,000 to $50,000 each, — among them an unrivalled Jan Steen, The Family Musical Party, porcelains, bronzes, jewelry, tapestries, relics of the great Napoleon, hangings, embroideries, every species of bric-a-brac, gold and silver work, malachite and lapis-lazuli ornaments, sumptuous furniture, books, wines, carriages, the rare plants of the hot-houses, in short, the gatherings and caprices of a man of an untold income, good and bad, bought as a diversion or to kill time. The prince intends building a superb villa, and the design is to be open to the competition of architects of every country, with only one restriction: it must be in the style of Henry II. of France.

A Relic of the Third Voyage of Columbus. — The *Moniteur* of Martinique prints an interesting story about the finding of an anchor belonging to the ship upon which Christopher Columbus sailed on his third voyage of discovery to the New World. On the night of August 1, 1498, says the *Moniteur*, the small fleet had come to an anchor at the southwestern extremity of the island of Trinidad, to which the navigator had given the name of Arenas Point. Washington Irving relates that Columbus, who was a very poor sleeper, suddenly heard a frightful noise, apparently coming from the south. Rushing on deck he saw rolling toward him a wave as huge as a mountain, which threatened to submerge the fleet. All hands thought their last hour had come; but the only damage sustained was the loss of one of the anchors of the admiral's ship. The big wave was caused by the sudden swelling of one of the rivers that empty their waters into the Gulf of Paria, the existence of which was unknown to the discoverer. The incident is mentioned in the narrative of the voyage bequeathed to us by Ferdinando, Columbus's son. This historical anchor has been found after all these centuries by Señor Agostino, the owner of Arenas Point. It weighs 1,100 pounds, and is of decidedly primitive form. Señor Agostino found it while making some excavations in his garden. This garden, upon careful measurement, appears to occupy the precise spot where rode the ships of the great mariner in 1498. The finder at first took his treasure trove for a Phœnician anchor, but upon attentive examination he found the date of 1497 on the stock.

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BUILDING INTELLIGENCE.

[Reported for the American Architect and Building News.]

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents;

223,446. AUTOMATIC DAMPER-REGULATOR. — Florentine A. Jones, New York, N. Y. The object of this invention is to provide a simple means for automatically operating the damper of a steam-boiler furnace. The invention employs one or more diaphragms, in connection with springs arranged in steam-chambers, and actuated by steam pressure so as to raise or lower a connecting-rod, which moves a lever connected with the damper in the furnace-flue. A and B are two steam-chambers, connected with each other by the tubes F F, which are connected with the boiler by means of tubes attached to the openings G G or *m m*. In the chambers A and B are arranged diaphragms C C′, secured by the caps H H. Within the chamber A is a volute spring, D, which presses the diaphragm C downward. To the centre of D is secured a connecting-rod, E, which is also attached, at its upper end, to the diaphragm C′ in chamber B. To the rod E is pivoted a lever, I, connected at one end to the lower steam-chamber casing by means of hinged link K, as shown. The free end of the lever I is to be connected, by means of one or more levers, to the flue damper-rod. A weight, L, may be placed on the lever I, to accurately adjust the closing of the damper. For ordinary use one spring may be sufficient, but in case of very high pressure an additional spring may

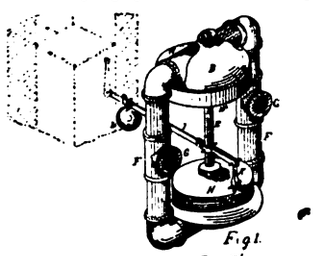

Fig 1.

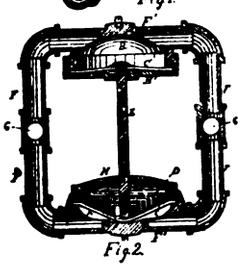

Fig 2.

be similarly applied to the upper diaphragm, C′, in chamber B. In the application of the invention to boilers of very low pressure the diaphragm C and spring D in the chamber A are sufficient to actuate the rod E, and consequently the flue-damper, without the necessity of using the diaphragm C′ in chamber B. In this case the upper portion of the device on a line with the openings G G may be dispensed with, the ends of the tubes closed, and steam be admitted to the chamber A through an opening made at *m* in the bottom of said chamber. The diameter of the diaphragm C′ is smaller than that of C in chamber A, so as to expose a smaller area to the action of the steam, for the reason that if the surfaces exposed to the action of the steam were of the same area in both diaphragms the force exerted upon one diaphragm would be equal to that upon the other, and consequently produce no effect upon the connecting-rod. In operation, the steam enters the tubes F F by means of tubes connecting the openings G G with the boiler. The steam then passes into the chambers A and B, exerting its force on the diaphragm C upward and on diaphragm C′ downward. As C presents the largest area, the pressure of steam on it will be the greatest, thus carrying up the connecting rod E and pressing up the diaphragm C′. Inasmuch as C cannot rise without compressing D, it follows that it will reach a point where the pressure downward of diaphragm C′, aided by the resistance of spring D, will exactly equal the pressure upward of the diaphragm C. When the pressure of steam is reduced in the boiler it will be correspondingly reduced on the diaphragms; but the force of the spring D will remain the same, and will have the tendency to draw the rod E downward until it ceases to act, so as again, with the diaphragm C′, to equal the pressure on C, thus actuating the connections to the damper and causing the latter to open or close as the pressure of the steam diminishes or increases.

224,775. IRON COLUMN. — William J. Fryer, Jr., New York, N. Y.

224,786. HANDLE FOR TOOLS. — Henry A. Moore, Texas, Ga.

224,789. SAW-SET. — Charles Morrill, New York, N. Y.

224,804. WINDOW-FASTENER. — Lorenzo Stebbins, Hinsdale, N. H.

224,814. DRYING-KILN. — Charles L. Campbell, Terre Haute, Ind.

224,818. WINDOW-FRAME. — Susan H. Decou, Centreville, O.

224,833. FASTENER FOR MEETING-RAILS OF SASHES. — Leander K. Lippincott, Washington, D. C.

224,837. CURTAIN-FIXTURE. — James Montgomery, Marseilles, Ill.

224,841. COMPOUND FOR REMOVING PAINT AND VARNISH. — William H. Nordaby, Germantown, N. Y.

224,867. MACHINE FOR DRESSING MOULDINGS. — John C. Brandon, Detroit; Mich.

224,878. CHIMNEY-CAP AND COWL. — Charles C. Caywood, Clarksburg, W. Va.

224,891. SASH-FASTENER — Thomas M. Foster, Union City, Penn.

224,895. MANUFACTURE OF POTTERY WARE AND MORTAR. — John Fults, Washington Court-House, O.

224,900. ELEVATOR. — John A. Groshon, New York, N. Y.

224,901. HYDRAULIC ELEVATOR. — William E. Hale, Chicago, Ill.

224,903. METALLIC TENON FOR BLIND-SLAT. — Andrew L. Hill, Decatur, Ill.

224,912. LIME AND CEMENT KILN. — Benjamin F. Holland, Utica, Ill.

224,918. BLIND-SLAT RETAINER. — James J. Jardine, New Haven, Conn.

224,938. PAVING-TILE. — William J. Mitchell, San Francisco, Cal.

224,940. DOOR-CHECK. — Amand Meritte, Rouen, France.

224,945. APPARATUS FOR ILLUSTRATING THE RULES OF PERSPECTIVE DRAWING — Frank O'Ryan, New York, N. Y.

224,962. PARALLEL-RULER. — Charles D. Sigsbee, Washington, D. C.

SUMMARY OF THE WEEK.

Atlanta, Ga.

HOUSES. — Messrs. Parkins & Bruce have in hand houses for M. C. Kiser, J. T. Kiser, and Mr. Winship, which will cost respectively $15,000, $15,000, and $10,000.

SOCIETY BUILDING. — Messrs. Parkins & Bruce are the architects of the new building for the Young Men's Library, which, at a cost of $25,000, is now building.

STORE. — The same architects are also building a store for Judge Hillyer, which will cost $8,000.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since our last report: —

German Savings Bank, three-st'y brick and stone building on Baltimore St., between Green and Pine Sts.

Johnstone Bros. & Co., 2 five-st'y iron-front warehouses, Howard St., near Lombard St., 30′ x 80′.

Tilman & Haskins, three-st'y brick building, North St., between Eager and Chase Sts., 16′ x 36′.

Florence Patterson, three-st'y brick building, Pratt St., between Gay and South Sts., 30′ x 256′.

G. W. Ward, five-st'y iron-front warehouse, northeast corner Charles and Baltimore Sts., 50′ x 70′.

B. & O. R. R. Co., seven-st'y brick and stone building, northwest corner Calvert and Baltimore Sts., 102′ x 104′.

John King, Jr., 2 four-st'y brick and stone warehouses, Sharp St., between Lombard and Pratt, each 30 feet front.

ALTERATION. — Messrs. Wyatt & Sperry are preparing drawings for an addition to the residence of Mr. Geo. A. N. Moale, in Baltimore County, to cost about $3,500.

BANK. — The Traders' National Bank has purchased the property fronting 23 feet on German Street, corner of Grant Street, running back to Mercer Street 75 feet, on which they propose to build a banking house.

SOCIETY BUILDING. — Mr. F. E. Davis, architect, is preparing drawings for a Biblical Institute, to be built on the corner of Edmonson Avenue and Fulton Avenue, 70 by 66 feet, three stories and basement, to be built of stone, and to cost about $25,000.

WAREHOUSES. — Negotiations are now pending looking to the purchase of the property of the First Methodist Episcopal Church, on the northeast corner of Charles and Fayette Streets. It is designed to build on this site a row of fine warehouses. Purchasers are ready, but some of the members of the church are opposed to selling the property. The majority, however, are in favor of moving to some up-town location.

Boston.

BUILDING PERMITS. — Since our last report the building permits granted are as follows: —

Brick. — 847 *Marlboro' St.*, for W. F. Whitney, 1 dwell., 20′ x 55′; three stories; Standish & Woodbury, builders.

Bussey Place, Ward 10, for C. G. Chase, 1 store, 22′ x 60′: five stories; D. H. Jacobs & Son, builders.

Cor. Fairfield and Newbury Sts., 4 dwells., 25′ x 36′, 23′ x 40′, and two 22′ x 42′; Alden Avery, owner and builder.

226 *Marlboro' St.*, for S. T. Ames and F. Whitwell, 2 dwells., 25′ x 55′; three stories; E. C. Chapin, builder.

Wood. — *P St.*, Ward 14, for A. H. Emery, 1 dwell., 30′ x 38′; three stories.

146 *Condor St.*, for N. E. Pottery Co., 1 workshop, 27′ x 80′; three stories; D. Damon, builder.

N. Beacon St., Ward 25, for H. B. Goodenough, 2 dwells., 21′ x 31′; A. J. Needham, builder.

HOUSES. — Mr. W. Whitney Lewis is the architect of a house for Mr. F. J. Doe, on Commonwealth Avenue; McKenzie & Campbell, carpenters.

On Marlboro' Street is building a residence for Dr. W. F. Whitney, from the designs of the same architect; Morton & Chesley, carpenters; Standish & Woodbury are masons of both.

Drawings are also made for a house for Mr. Charles J. Blake, on Marlboro' Street.

PROSPECTS. — Building operations for January and February are forty per cent better than last year.

WAGES. — As help is coming from out of town, labor prices are not higher at present. When spring work begins a general rise will probably take place.

Brooklyn.

BUILDING PERMITS. — *Morton St.*, 1 one-st'y brick machine-shed, 38′ x 26′; owner, J. C. Keenan, 32, 34, and 36 Morton St.; builders, Parks & Koch.

Ten Eyck St., three-st'y brick factory, 45′ x 94′; cost, $9,000; owners, S. Waterbury & Co., on premises; architect, B. Cossine; builders, John McQuaid and Jas. Friesse.

Metropolitan Ave., *No.* 40, 1 three-st'y frame tenement, 25′ x 50′; cost, $3,400; owner, M. Uhlers, Johnson Ave., near Ewen St; architect, John Platte.

Graham Ave., cor. McKibben St., 1 three-st'y frame store and tenement, 25′ x 55′; owner, C. F. L. Eichhorn, Myrtle Ave., near Broadway; architect, John Platte; builders, Ulrich Maurer and D. Kreuder.

Ten Eyck St., 1 three-st'y frame tenement, 25′ x 50′; owner, Fredrich Specht, Ten Eyck St., near Ewen St.; architect, John Platte; builders, B. Rauth & Bro. and C. Weber.

Willoughby Ave., 3 three-st'y brick dwells., 20′ x 42′; cost, each, $6,000; owner, P. F. O'Brien, 164 Bedford Ave.; builders, Ashfield & Sons.

Carlton Ave, 3 three-st'y brown-stone dwells, 16′ 8″ x 45′; cost, each, about $6,000; owner and builder, Thomas Fagan, Grand Ave, near DeKalb Ave.; architect, Robert Dixon.

Cleveland.

APARTMENT-HOUSE. — An apartment-house is to be built for W. B. Hale, on Lake Street, of brick and stone, four stories in height, 33 by 77 feet, containing 35 rooms; cost, about $8,000; B. S. DeForest, architect.

HOUSES. — Messrs. Cuddell & Richardson are preparing plans for Mr. Feideman for a two story frame summer residence on Lake Avenue; cost, $8,000.

A four-story brick block of five dwellings is to be built for Mr. I. M. Hubby, on the corner of Hayward and Sibley Streets, at a cost of about $25,000.

Also, a block of two dwellings on Prospect Street, near Case Avenue. The front is to be of Amherst stone, and to cost about $20,000. Mr. Joseph Ireland is the architect of both.

Messrs. Heard & Smith, architects, are engaged on a number of fine residences, the principal one being for Mr. Wilson Dodge, on Dodge Street, three stories high, 58 by 70 feet, to be entirely of Amherst stone; cost, about $20,000.

Messrs. Coburn & Barnum have a number of very fine residences on the boards, of which a two-story frame dwelling for Mr. L. A. Hall, on Dunham Avenue, is the leading one; 40 by 50 feet; cost, $5,000.

Messrs. Blackburn & Charlot, architects, are to build a two-story frame house for Mr. Chamberlain, on Madison Avenue, at a cost of $5,000.

SEMINARY BUILDING. — Messrs. Cuddell & Richardson, architects, have a large number of buildings on hand, the principal one being a large addition to the Notre Dame Seminary, corner of Superior and Huntington Streets. To be of brick and stone, four stories in height, 46 by 88 feet; cost, $15,000.

STORES. — Mr. Levi T. Scofield, architect, is busily engaged on the fine new block for E. M. McGillin & Co., on the corner of Superior and Seneca Streets. The building will be 40 by 150 feet, to be built of Philadelphia pressed brick, with red terra-cotta finish; probable cost, $25,000.

He is also preparing plans for a number of buildings and dwelling-houses.

Messrs. Blackburn & Charlot are preparing plans for a three-story brick block, 30 by 90 feet, to be built by Mr. M. L. Shay, on Pearl Street.

New York.

BUILDING PERMITS. — *One Hundred and Eleventh St.*, 8 four-st'y brick tenements, 25′ x 60′; J. M. Meehan, owner; Andrew Spence, architect; H. Meehan, builder; cost, $72,000.

Fourth Ave., cor. Fifty-eighth St., two-st'y brown-stone front stable, 25′ x 100′; William Van Antwerp, owner; Joseph Smith, builder; cost, $6,500.

Fifty-second St., 3 stables and dwells., 37′ x 100′ 5″, 25′ x 100′ 5″, and 37′ 6″ x 100′ 5″; Montrose blue-stone fronts; W. S. Gurney and D. O. Mills, owners; Charles Buck, architect; cost, $47,000.

Third Ave., brick foundry, 70′ x 125′, for F. L. Mott Iron Works; Thos McAvory, architect; N. P. Dunham, builder.

Eightieth St., for Edward Clark, 1 brick dwell., 45′ x 16′; Jno. Banta, builder.

One Hundred and Twenty-sixth St., cor. Madison Ave, 1 brown-stone dwell., 20′ x 50′; cost, $12,000; J. H. Valentine, architect; W. B. Birdsall, owner and builder.

One Hundred and Twenty-sixth St., 5 brown-stone dwells., 18′ x 50′; cost, $50,000; J. H. Valentine, architect; W. B. Birdsall, owner and builder.

ALTERATIONS. — *Avenue C. No.* 137, four-st'y brick store and tenement, two-st'y brick extension, 20′ x 17′, and new front to be put in first story; cost, $1,800; owner, Morris Osterweis; carpenter, Guy Culgin; mason, Richard Shapter.

Forty-fifth St, two-st'y brick fat-rendering house, one-st'y brick extension, 25′ x 75′; cost, $1,500; owners, East Side Reudering Association; architect, George Brown; builders, Murphy & McGinty.

Centre St., *No.* 138, five-st'y brick store, one-st'y brick extension, 19′ x 38′; cost, $1,500; owners, Lorillard Estate; mason, E. Anderson.

Front St., *No.* 4, five-st'y brick warehouse, to be fitted up as offices and storerooms for L. R. R. Co.; cost, $8,000; owners, N. Y. E. R. R. Co; builders, Klappert & Sons.

Front St., *No.* 5, five-st'y brick store and factory, an additional story; cost, $2,000; owner, Rufus Story, 7 Front St.; masons, Van Dolson & Arnott.

Wall St., *No.* 33, five-st'y brick office building, interior alterations; cost, $1,800; owner, Mechanics' National Bank, on the premises; architects, O. P. & R. F. Hatfield; builders, A. A. Andruss & Sons.

Fifth Ave, cor. One Hundred and Twenty-fifth St., brick church and chapel reconstructed; cost, $65,000; owners, Rector and Vestry of Holy Trinity Church, 41 West One Hundred and Thirtieth St.; architect, Geo. W. Debevoise.

First Ave., *No.* 1611, four-st'y brick tenement and store, one-st'y brick extension, 18′ 4″ x 24′; cost, $1,100; owner, Nicholas Schumacher, 1093 First Ave.; architects, Thom & Wilson.

Chrystie St., *No* 181, four-st'y brick tenement and stable, interior and exterior alterations; cost, $2,200; lessee, Bernhard Breder, on premises; architect, F. W. Klemt.

Sixty-sixth St, *No.* 46 *E.*, four-st'y brick dwell., four-st'y brick extension, 15′ x 38′; cost, $7,500; owner, Mrs. L. N. Yelverton; architect, James E. Ware; builder, A. Shipman.

Pearl St., *No.* 323, five-st'y printing establishment, walls to be raised; cost, $4,400; owners, Valentine & Co.; architect, Edward E. Raht; masons, Peter T. O'Brien & Son; carpenters, W. Germond & Co.

Eighth Ave, *Nos.* 851 *to* 859, 5 four-st'y brick stores and dwells., new store fronts to be put in first story and internal alterations; cost, $3,500; owner, Wm. T. Walton, 303 West Fifty-first St.; architect, Daniel Burgess.

Broad St., *No.* 29, four-st'y brick office building, internal alterations; cost, $10,000; owner, D. Parrish; architect, Wm. W. Gardiner.

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Forsyth St., No. 35, three-st'y frame and brick store and dwell., to be raised three feet, a one-st'y brick extension, 25′ x 34′, and internal alterations; cost, $6,000; owner, Bernard Rourke; architect, Julius Boekell.

Eleventh St., No. 38 *East*, two-st'y and attic brick dwell., to be made five stories, to be extended on rear 16′ x 53′, and to be connected with adjoining hotel; cost, not estimated; owner, A. S. Rosenbaum; architect, Henry Fernbach.

Churches. — The Church of St. Leo is to be built on lots Nos. 11 and 13 East Twenty-eighth Street, from designs of Mr. L. J. O'Connor; it will cover 50 by 100 feet; to be in the Gothic style with octagonal turret. The nave will be 81 feet broad and 56 feet high, the roof open-timber. The exterior front will probably be of Newark rubble-stone with Plainfield-stone finish. The cost is estimated to be about $40,000.

Mr. O'Connor is also preparing plans for the Church of St. Lawrence, with school and pastoral residence, which will be built at a cost of about $250,000. The church will be in Gothic style, and will be built of stone, with granite or Lockport limestone finish. The school and residence will be of brick, with same finish as church.

Factories. — A large factory is to be built on One Hundred and Sixth Street, for Messrs. Nathan & Dreyfus, and on the corner of Columbia and Stanton Streets one is to be built from designs of Mr. W. Wheeler Smith; Mrs. Miller, owner.

Houses. — On the north side of Seventy-ninth Street, between Fifth and Madison Avenues, Messrs. Squire & Woolley propose to build six first-class houses.

Office Building. — No. 55 Broadway is to be rebuilt from designs of Mr Walter Cook.

School-House. — The city proposes to build a new school-house on Sixty-first Street, between Second and Third Avenues.

Stable. — At 115 West Twenty-fourth Street, a stable is to be built for Mr. Henry Maillard; Mr. Jas. E. Ware, architect.

Store. — No. 414 Grand Steeet is to be rebuilt as a store. It will be four stories, with basement, of brick, with Ohio-stone finish, and will cost about $12,000; Mr. L. J. O'Connor, architect.

Tenement-House. — The Lorillard Estate Trustees have decided to build, at the corner of South Fifth Avenue and Spring Street, in place of the stable previously reported, a tenement-house, the first floor to be used as a store. The lot is 25 by 93 feet.

Philadelphia.

Factories. — *Broad*, cor. Spring Garden St., 1 three st'y office and factory building, 45′ x 116′; owners, the Baldwin Locomotive Works; architects, Wilson Bros. & Co.; contract not yet awarded.

Leverington Ave., between Chestnut and Hamilton Sts., 1 three-st'y factory, 60′ x 140′; contractor S. S. Keely; cost, not given.

Cammilla St., between Eleventh and Twelfth Sts., 1 four-st'y factory, 47′ x 127′; owners and builders, Campbell & Elliot; cost, not given.

Houses. — *Fifteenth*, cor. Ellsworth St., 1 three-st'y dwell., 18′ x 42′; builders and architects, D. Henon & Son; cost, $4,000.

Hancock St., north of Cumberland St., three-st'y brick dwell., 18′ x 55′; owner, Wm. McGeorge; cost, about $5,000; contract not yet awarded.

Providence.

Alteration. — The building at the corner of Westminster and Clemence Streets, the interior of which was recently destroyed by fire, is to be remodelled in accordance with plans prepared by Mr. Fred Pope, of Boston. The store front will be rearranged, and a one-story addition, 38 by 72 feet, made at the rear of the building.

House. — Mr. Hiram B. Aylesworth is building a two-story and French roof frame building on Wesleyan Avenue. W. H. Colwell is the architect.

St. Louis.

Building Permits. — Forty-four permits have been issued since our last report, of which eleven are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows: —

Owners.	Use.	Stories.	Rooms.	Cost.
R. B. Brown.	Warehouse.	2	2	$9,000
Dodd, Brown & Co.	Warehouse.	3	3	7,500
F. A. Witte.	Store.	4	4	7,000
P. W. Hincke.	Dwelling.	2	6	4,000

General Notes.

Atlantic City, N. J. — Messrs. Wilson Bros. & Co., architects, of Philadelphia, have just completed plans for a depot for the Pennsylvania Railroad Company. The new route is expected to be open for travel by May 15.

Bryn Mawr, Penn. — Taylor College, three four-story buildings (stone and fire-proof), one building 78 by 130 feet, one 54 by 100 feet, one 48 by 128 feet; architect, Addison Hutton; contractors, the owners; cost, not known.

Camden, N. J — One two-story and basement weaving and spinning-mill (brick), 61 feet 6 inches by 122 feet 6 inches, with two-story engine-house, 28 feet 2 inches by 25 feet, and two-story boiler-house, 22 by 33 feet, and wash-house, 18 by 30 feet, with one 80 horse-power buckeye engine, two 100 horse-power boilers; owner, Richard Williamson, Esq., Philadelphia; architect and engineer, W. H. Geissinger, of Philadelphia; contractor, John S. Steele; cost, $30,000.

Colchester, Conn. — The selectmen have been authorized to rebuild the almshouse burned last summer, and $2,500 has been appropriated for that purpose.

Covington, Ky. — Mr. Edwin Anderson, architect, of Cincinnati, is building houses for Mr. Hart and one for Mr. John E. Orr.

Cumberland, Md — Mr. Adler, of Baltimore, is putting up a large store here, 23 feet front by 109 feet deep, three stories high, to be of brick and stone; cost, $8,000. Mr. F. E. Davis, of Baltimore, is the architect.

Dassel, Minn. — The Swedes are thinking of building a new church.

Findlay, O. — The plans and specifications for the new West End Primary School Building have been accepted by the Board. The building is to accommodate 450 pupils.

Franklin, Ind. — Surveyors have laid out the ground for the starch works, and work will be commenced in a few days. They will cost about $50,000.

Gadsden, Ala. — Messrs. Parkins & Bruce, architects, of Atlanta, Ga., are building a hotel here which will cost $30,000.

Hoboken, N. J. — For the Hoboken Ferry Company some new ferry buildings are being built from designs of Messrs. Gambrill & Ficken, of New York. They are in the Queen Anne style, and of elaborate construction.

Ironton, O. — Mr. Edwin Anderson, of Cincinnati, is the architect of the new office building of Hiram Camphill & Sons.

Mr. Anderson is also building a house for Mr. W. S. Kirker.

Long Branch, N. J. — A cottage measuring 50 by 70 feet, together with a stable, is now building for Mr. Amos Cotting, of New York, from drawings of Mr. W. W. Lewis, of Boston, architect. A considerable quantity of face brick and terra-cotta is employed both outside and inside. R. V. Breese, builder; cost, $24,000

Logootee, Ind. — The contracts for St. John's Church are ready for letting by the architect, Mr. A. Druiding, of St. Louis, Mo.

Louisville, Ky. — H. C. McDowell, one-st'y store on Green St., between Fourth and Fifth; cost, $3,150.

R. A. Robinson, four-st'y stone and brick store on Fourth St., between Jefferson and Market; cost, $10,000.

The Newcomb-Buchanan Company, two-st'y frame house, cor. Main and Johnston Sts.; cost, $1,000.

Manchester, N. H. — This city is to build a school-house 22 by 63 feet and two stories high, to cost $4,800.

Marblehead, Mass. — Mr. W. Whitney Lewis, of Boston, is the architect of two houses at Peach's Point, for Dr. Whitney and Mr. Sidney Burgess. They are now ready for plastering, and will cost $5,000 apiece. A. Roscoe is builder of both.

Menekaune, Wis. — The contemplated Sawyer Mill will soon be built here. The timbers are ordered, and a mill costing from $35,000 to $40,000 is determined on.

Middletown, O. — The plans for the new city buildings are now open for inspection. The work will begin at once.

Natchez, Miss. — A yarn mill 48 by 160 feet is building here.

New Bedford, Mass. — Messrs. Hammond & Sons are the architects of the two-story brick store building for Hawes, Macomber & Homer, on Acushnet Avenue; cost, $15,000.

New Haven, Conn. — Plans for a Seaman's Bethel at Belle Dock are prepared, and $1,100 have been raised.

Newport, R. I. — John T. Bush is having a $6,000 house built on upper Ayrault Street.

North Attleboro', Mass. — Messrs. Kenyon, Whitaker & Smith are building a Queen Anne cottage for Mr. H. F. Barrows. Walker & Gould, of Providence, R. I., are the architects.

Oakland, Cal. — The new work that has been started since the 1st of January is as follows: —

Brick, stores and offices; E. Hook, owner; J. C. Mathews & Son, architects; three stories, 100′ x 45′; $20,000. Frame, dwelling; P. Thomson, owner; J. C. Mathews & Son, architects; two stories; $4,500 Frame, dwelling; Haskel & Smille, owners; J. C. Mathews & Son, architects; two stories; $2,500. Frame, dwelling; T. Delger, owner; J. C. Mathews & Son, architects; two stories; $5,000. Frame, dwelling; Mr. Plaw, owner; Wm. Smith, architect; one story; $5,000. Frame, three tenements; W. Naegle, owner; T. Welch, architect; one story; $4,200. Brick, Masonic Temple: Masons, owners; Wright & Sanders, architects; three stories, 105′ x 64′; $75,000.

It is anticipated that Flood, O'Brien, and other San Francisco millionaires will build here this year.

Ocean Grove, N. J. — Mr. J. Ireland, of Cleveland, is the architect of the summer hotel building for H. Martin; cost, $5,000.

Omaha, Neb. — The contracts for the Church of the Holy Family are ready for letting by Mr. A. Druiding, architect, of St. Louis, Mo.

Ottumwa, Io. — Mr. C. A. Dietrich, architect, has the following work on hand at present: —

Two store buildings for A. P. Peterson; cost, $5,000.

One dwelling for B. F. Hyatt; cost, $2,500.

Additions to residence for J. W. Edgerly; cost, $2,000.

Pawtucket, R. I. — Mr Geo. H. Fuller is about to build a jeweller's shop. The architects are Messrs. Stone & Carpenter, of Providence. Contract for the mason's work awarded to Patrick Farrell; the carpenter's work to Kenyon, Whitaker & Smith; cost, $10,000.

Littlefield Brothers are making a large addition to their mill, at a cost of about $12,000; mason's work, Charles Dean; carpenter's work, French, McKenzie & Co.; Walker & Gould, of Providence, are the architects.

Mr. Daniel Wilmarth is now building a dwelling-house for Mr. Smith Grant, on Broad Street; Walker & Gould, architects, Providence, R. I.

Messrs. Stone & Carpenter, of Providence, R. I., are the architects of a new two-story dwelling now building on Summit Street for Mr. Cottrell.

Land has just been purchased for the new freight depot of the Providence & Worcester Railroad.

Peoria, Ill. — The building committee has been ordered to advertise for plans for the Ninth Ward School-House, not to cost more than $12,000.

Piopolis, Ill. — Mr. A. Druiding, architect, of St. Louis, Mo., is ready to let the contract for building the new Church of St. John.

Pittsburgh, Penn. — Miller, Metcalf & Parkin, of the Crescent Steel Works, are building a two story brick addition, 34 by 64 feet, to their wareroom.

Pittsfield, Mass. — W. F. Milton, of New York, has had plans made for a house in the Queen Anne style, 34 by 51 feet, the first story of brick and the second of wood, finished throughout in hard wood.

Portland, Oreg. — Messrs. Clark & Upton are the architects of the two-story brick addition now making to the Norton House; cost, $13,000.

Radnor, Penn. — One stone dwelling, 52 by 64 feet; owner, Hon. J. Clark Hare, Philadelphia; architect, Allen Evans, of Philadelphia; contractor, G. W. Ensinger; cost, $12,000.

Ridgefield, Conn. — At a town meeting last week it was voted to appropriate $5,000 for a site for a State Insane Asylum, provided the State will locate an asylum here.

Rutland, Vt. — The Sutherland Falls Marble Company is erecting a new building 280 feet long.

Salem, O. — Mr. A. Kohler, of Cleveland, is the architect of the two-st'y brick school-house; cost, $18,000.

Sioux City, Io. — Mr. G. G. Baldwin is the architect of the two-story brick store building at the corner of Pearl and Third Streets; cost, $7,000.

Springfield, Ill. — The Ætna Flouring Mill, which was near the centre of the city, and which blew up on the 30th of December last, is to be rebuilt farther from the centre of business.

Another large extension is to be made to the Springfield Watch Factory the coming summer.

Syracuse, N. Y. — Mr. Archimedes Russell is the architect of the three-story brick school-house now building on North Salina Street for the Church of the Assumption; cost, $18,000.

A four-story brick house is building on Gifford Street, for C. Cork, Esq., by Mr. A. L. Merrick; cost, $8,000.

Terre Haute, Ind. — J. J. Bauer will build, on Main Street, a three-story stone-front building in the spring.

Toledo, O. — Mr. N. B. Bacon is the architect of a two-story brick house on Superior Street; cost, $5,500.

Toronto, Can. — It is said that the government architect has prepared plans for public buildings in this city which will cost half a million dollars.

Truckee, Cal. — The new round-house is to have twenty-two stalls, each capable of holding two engines. Work will begin in June.

Ukiah, Cal. — The Mendocino County Court-House is to be enlarged.

Westchester, Penn. — One pressed brick and timber cottage, two stories and mansard, 50 by 58 feet; owner, Miss M. R. Thomas, Philadelphia; architect, Frank Furness, of Philadelphia; contractor, W. H. Burns; cost, $10,000.

Westfield, Mass. — The Athenæum directors are figuring how to enlarge the capacity of the building, but have about concluded that nothing can be done except to build an addition, and for that from $5,000 to $10,000 will be required, which some public-spirited citizen can have the opportunity of donating.

Xenia, O. — It is reported that there are to be built a $40,000 school-house, a $10,000 improvement on the city building and a $10,000 work-house

Public Buildings.

Baltimore, Md. — Petitions from various officials and bodies of citizens, praying for the establishing of a new marine hospital, have been referred to the Committee on Public Buildings and Grounds.

Goose Hill Flats, Va. — The Committee on Commerce has before it Mr. Johnston's bill to establish a light-house on Goose Hill Flats on the James River.

Jacksonville, Fla. — The Committee on Public Buildings and Grounds has reported an amended bill to provide for building a public building in this city.

Louisville, Ky. — The Committee on Appropriations has before it Mr. Willis's bill, making an appropriation to repair the post-office and custom-house building.

Narragansett, R. I. — The Committee on Commerce has reported a bill to build a light-house on Whale Rock, at the entrance of Narragansett Bay.

New Albany, Ind. — Hon. Geo. A. Bicknell has introduced a bill appropriating $150,000 for a government court-house and post-office in this city.

Toledo, O. — Mr. Thurman's Senate Bill to provide for the construction of a public building has been referred to the Committee on Public Buildings and Grounds.

Washington, D. C. — The Committee on the District of Columbia has before it an amended bill to provide a site for a union depot in this city.

The Committee on Public Buildings and Grounds has reported a bill to enlarge the city hall.

Bids and Contracts.

Baltimore, Md. — Messrs. Wm. T. Markland & Bro. have been awarded the contract for two four-story warehouses on Sharp Street, at $48,800.

Chicago, Ill. — The contract for electric bells and speaking-tubes in the new court-house has been given to the Heisler Electric Company, of St. Louis, for $2,625. The contract for marble tiling to the Burlington Manufacturing Company, for $18,989. The same company also received the contract for marble wainscoting, at $44,988. The contract for the brick, masonry, and iron-work was awarded to P. J. Sexton, for $16,869.

Emmetsburgh, Io. — The contract for building the new court-house for Palo Alto County, B. J. Bartlett, architect, of Des Moines, has been awarded to D. E. Burdick, of Des Moines. Messrs. Bailey & Greensdale, of Milwaukee, Wis., have the contract for the jail work; and the Diebold Safe and Lock Company has the contract for the vault doors.

Fall River, Mass. — The contract for furnishing the window frames and window sashes for the new United States Custom-House has been awarded to James M. Adams, for $2,800.

Joliet, Ill. — The contract for building a new poor-house for this county has been awarded to William Werner, of Joliet, for $4,633.

Long Branch, N. J. — The contract for the extension of the Ocean Pier has been awarded to the National Construction Company, of New York city, for $40,000. The extension will be about 200 feet in length and 50 feet in width.

INDEX OF CURRENT WORK,

Giving information concerning important buildings now unfinished.

[Architects and Builders are requested to aid the editors in making the information in this department full and exact. Notice of the completion of a building is particularly desired.]

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Boston.

Stores. — Liberty Building. W. G. Preston, architect. Cost, $200,000.

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ONE may see from the progress of building laws and public opinion concerning them how rapidly we are taught by disaster. The authorities of Boston are learning from the fires of this winter that the building laws which they passed after the fire of 1872, and under which the "burnt district" was rebuilt, are by no means strict enough to secure them from serious fires. That they should be so was not to be expected, indeed, inasmuch as the precautions against fire at that time introduced were aimed rather at interrupting the spread of it from building to building than at making buildings which should not themselves burn readily. Rules that buildings should be encased in brick or stone or iron walls, with iron doors and shutters, and that roofs or outside finish, above certain heights from the ground, should be of incombustible material, with some restrictions on setting wood-work against chimneys, were thought to be all that could be insisted on in the way of protection against fires, leaving people to make the interiors of their buildings, even those which were intended for public uses and assemblies, as combustible as they would. That the buildings of the business part of Boston are on the whole a decided improvement on those they replaced, in solidity of construction and in workmanship as well as in architectural effect, no one will deny. But the time had not come for taking any special care, under pressure either of laws or of private enterprise, whether they were built to burn or not. The excitement into which the burning of three or four theatres threw the country led to making, under authority of the inspector of buildings, various improvements in the means of egress from places of amusement, and some attempts to lessen the danger of fire in them. But there is nothing in the building laws, we believe, to prevent the interior of a theatre or hall from being made as combustible as a country barn, and we can think of one public hall, in a third story, where within a year an iron staircase has been replaced by a wooden one.

THE matter is now before a committee of the city government, and several hearings have been held, the discussion having been as yet confined chiefly, we understand, to certain alterations proposed by the inspector of buildings, which have been circulated for general criticism. As might be expected these alterations are all on the side of safety (except one which diminishes the rise of party walls above the roof, now required), and so are to be approved and encouraged. They go, however, but very little way, and leave the most serious difficulties almost untouched. The most important of them is the requirement that in all hotels, tenement and lodging houses, the hall and staircase partitions shall be built of brick, not less than eight inches thick, or of other incombustible material, carried continuously up from the cellar and above the roof with an incombustible coping, and plastered without furring against the stairs. If this is adopted, as we hope it may be, it will be in the line of genuine progress. Such a provision will be the first real acknowledgment of the duty of building with regard to security, and once applied in one class of buildings may gradually extend itself to other like cases, till it shall become a fixed habit to guard at least the main communications in all buildings by fire-proof walls. It is, however, very incomplete and comparatively inefficient without the supplementary provision that the stairs themselves which are thus guarded shall be incombustible, as well as the landings and floors contiguous to them; for not only is it very difficult to shield combustible stairs even by fire-proof walls, but the stairs themselves are for one reason or another a peculiarly inviting point of attack for fire, as well as a very dangerous means of distributing it. Twice at least within a few weeks we have had to notice cases where fires were kindled under the stairs of tenement-houses: we recall one or two like cases in theatres, and the late fire in the Brooklyn (King's County) Penitentiary was started in this way. There are other buildings, too, in which such precaution is as important as in those that are cited, — in some even more so, — such as theatres, public halls, school-houses, and factories, or buildings used as such. We may hope, then, that it will not be necessary to stop where the proposed amendment now leaves the matter. The least enactment that will do credit to the knowledge, or the willingness to profit by experience, of the people of Boston will be one which requires that in buildings where men are accustomed to congregate they shall be furnished with stairs of fire-proof material, walled in with incombustibles.

ANOTHER need, which is touched but gingerly, is that of guarding lifting-apparatus. There is no provision for this except the very modest requirement that hatchways shall be closed with doors. The existing building laws in Boston were made before experience had shown how necessary it is to protect elevators from fire; to ignore this need nowadays would be, it seems to us, gross negligence. Passenger elevators are of no use for escape in case of fire, but they act as distributors of it even better than stairways; and when, as often happens, for the sake of compactness one is inscribed in a staircase, the two together make as pretty a combination as could well be devised of a fuse to set a building a-fire, with a trap to cut off escape from it. It ought to be obligatory to enclose elevators as well as stairs in shafts of brick or other material that will not burn, and then there would not be much temptation to put one inside the other. The provisions for protecting wooden floors by an inch of mortar, and for cutting off the flues between furrings on brick walls by projecting courses above the floors, are good in their way. Possibly it may not be practicable at this moment to carry through much more efficient restrictions, but we trust that at any rate it will not be long before the community can be led beyond this. The hollow boxes between floor-joists are more dangerous than the thinness of the floors, and it is even more important that the spaces behind plastering in walls should be closed beneath the floors than above them. It would not be a great advance, or a great oppression, to require that shops, warehouses, and factories at least should be well floored, and that the hollows in walls and partitions should be intercepted once or twice in each story. The architects of Boston, among them a committee from their chapter of the Institute, are in consultation with the authorities on these questions. The present building law is in a great degree the work of the architects. It is to be hoped that they may be influential now in substantially improving it.

THE President has spoken on the canal question. He has not concerned himself with any aspect of it but its relation to the Monroe doctrine, and on this his message is explicit. "The policy of this country," he says, "is a canal under American control," and we cannot surrender this control to any European power or powers. This, to our mind, is mixing up two ideas which might well be kept distinct. If the United States must really control the canal, that is one thing, and means that we must build it, — or else, since we do not seem likely at present to do this, we must continue to be the dog in the manger. On the other hand, if we simply say that European governments shall not control the canal, this is an intelligible, if unnecessary, application of the Monroe doctrine, as wide a stretch, we should think, as it will cover without violence, and is equivalent to saying: Let the canal be built under whatever local authority and by whatever private hands it may be, but European governments must keep their hands off it. It will be, says the President, "virtually a part of the coast line of the

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United States." It would be if we owned it, but otherwise it is not clear why it should be so, any more than the coast of South America, which our eastern ships have now to skirt to get to San Francisco. It would be shorter, and therefore more convenient to us as well as to the rest of the world, but it does not appear why that should make it our own, virtually, or really, or apparently. The President thinks, however, that it is our right and duty to assert and maintain such authority over any isthmus canal as will protect our interests, and he intimates that if any treaties stand in the way of this they had better be abolished.

How much favor the President's message will find with Congress is uncertain when we write. That it will have some strong support is plain from the temper that has already been shown, and is indicated by a joint resolution which the House Committee on the Canal are said to have ready to report, and which, after reciting that any European protectorate or any scheme which carries the right of European interference is opposed to the Monroe doctrine and dangerous to us, declares the right of the United States "to have possession, direction, control, and government" of any inter-oceanic communication whatever; its duty to assert its right to possess and control, and the propriety of abrogating any treaty that interferes with this. The clear logic of all this and of the arguments of the press on the same question is this: If a foreign government, or a company chartered under a foreign government, owns the canal, that government will have to interfere for its protection and control; this will lead to a protectorate; the United States cannot allow a European protectorate, therefore it must assume control itself. The resulting conclusion the advocates of interference have refrained from stating, but it follows necessarily. The same conditions which under European control would lead to a European protectorate will under American control lead to an American protectorate, and it is to this, therefore, that the present course of politics would commit us. It is not the business of the *American Architect* to discuss protectorates, but it is well to see what conclusions follow from the intrusion of politics into this commercial and technical question. There are many people, however, who take a sober view of the question, and to whom it does not appear that our welfare, or even our doctrines, are as yet imperilled, and who find leisure to look at the abstract rights and practical conditions of the matter. We may call attention to the clear letter in the New York *Tribune* in which Professor Woolsey, of Yale, repels the application of the Monroe doctrine to the question. The effect of action by the Government in the spirit of the President's message would be probably to kill the whole scheme of an isthmus canal for the present, unless Americans are willing to build a canal themselves. Foreign governments are not likely to interpose nor foreign capitalists to invest, in the face of a manifesto from the United States. M. de Lesseps has been received in this country with personal cordiality, and the political opposition which he sees in his way is leading him, it is rumored, to propose to incorporate his company, of which he has hoped, or proposed, to sell half the stock here, under the authority of the United States.

As might be expected, the labor troubles seem not yet to have reached their height. Accounts of strikes come from all over the country: we hear of them in the mining regions and iron manufactories of Pennsylvania, in the manufacturing towns of New England, and among the trades all over the country. In many cases the masters, after short resistance, have yielded; in others they still wait. The movement seems to be spreading among the building trades, among which, in the United States, strikes have been comparatively rare. At our last accounts the carpenters of Boston were preparing for a demand on their employers, to be followed by a strike if it is not granted. That these things should accompany a fit of speculation and a general rise in prices was to be expected, but they are a great embarrassment to business, and a check to its returning current. It is even said that building-contractors in New York are preparing to forfeit their contracts rather than try to carry them out in the face of the advance in prices and uncertainty of wages. If this uncertainty continues, the check which will follow will be a severe blow to builders; and to architects, who have begun to take down their unused T-squares and fill their empty offices again with draughtsmen. From San Francisco come rumors of the concentration of troops in preparation for any violence from the unemployed. These rumors are denied, but the evident determination of the authorities to repress violence by force has had its effect, and Sand-lot oratory has grown much milder, counselling moderation. Kearney, indeed, has warned his followers that the oppressor is trying to stimulate them to unlawful outbreaks, that he may have an excuse to put them down with an armed hand. This will have a wholesome effect, and is at least a convenient cover for retreat. We learn that the Chinese are beginning to yield to the pressure upon them, and are withdrawing from San Francisco. The Chinese population on the Pacific coast is said to have considerably diminished within a year or two. This is due mainly to returns to China, but now we see the beginning of a movement eastward, and numbers of the Chinese are said to be on their way from San Francisco toward the Atlantic. There is also a report that Southern planters are looking to them to supply the places of the blacks lost by the northern emigration of a year past. There is probably no place where Chinese labor would provoke less hostility than on Southern plantations. What would be the effect on the Southern States of introducing another race question is not so clear.

A case which should have a steadying effect on the disturbers of other workingmen's families was decided in an Ohio court, the other day. A firm of glass manufacturers in Gainesville, having been admonished by the glass-blowers' association, of which its workmen are members, that it must make no more than a given number of boxes of glass per week, discharged the men who refused to disregard the orders of the union, and imported a number of Belgians to take their places under a three years' contract. The Pittsburgh association sent its president, Mr. Shearer, to entice the new men away from their work, whereupon the employers procured an injunction from court restraining him from meddling with the workmen. On Mr. Shearer's application to have the injunction dissolved, the court decided, after a full hearing, that it must stand; and, reviewing the action of the trades-union, declared it in conflict with the laws of the State and of the United States, — on the ground, we presume, though we do not see it so stated, that it was an effort to impair the obligation of contracts. This point has been touched before in trades-union disputes, and it suggests the remedy to which employers are likely to be driven if workingmen persist in turning business upside down, as they have been doing of late years. The contract system, in fact, carried to its logical conclusion, implies a contract between a contractor and his workmen, as well as between him and his employer. A resort to this, especially in building contracts, is the natural security of a man who must know how much the work will cost which he has promised to do for a given sum.

The opportunities for revising and improving a large public building which must necessarily be many years in the hands of the workmen are many, and possibly Mr. Edwin May, the architect of the new state-house at Indianapolis, who died February 27, at Jacksonville, Florida, would have materially revised and improved his original design for that building, which must now be entrusted to another's understanding of his intentions. It is unfortunate that the state-houses of three large Western States should have been deprived of the care of their authors; but the state-houses at Springfield and at Des Moines were already well under way, and the drawings for the greater part of the unfinished work must have been prepared at the time of the death of their architects, while the Indiana State-House is hardly begun. Of Mr. May's early life we know but little. He was at the time of his death fifty-six years of age, and for more than twenty years had been in active and successful practice in Indianapolis, whither he had removed from Boston, it is said. Besides the state-house, which he considered the most brilliant achievement of his profes-ional life, he was the architect of a number of court-houses, jails, and public institutions; amongst these are the Northern Prison, built in 1858, and the women's department of the new Insane Asylum, which is now nearly completed, at a cost of over $700,000. Mr. May's death brings to notice the fact that although the designer of the state-house, he was, strictly speaking, not the architect, but merely the supervising architect, of the building; in other words, an official dependent on the will of the Board of State-House Commissioners, since he had sold his drawings and specifications outright for the sum of $6,000, — and if our readers will recall the onerous conditions of the original competition (see *American Architect* for March 24 and 31, 1877), they can judge for themselves how remunerative a bargain this was. We believe there is an English ruling that the heirs of a deceased

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architect can recover only the fee due for work performed and completed; so in the light of events, perhaps Mr. May's action was after all fortunate.

THE project for a monument to Washington, in New York, moves with a rather staggering gait. A bill was introduced into the United States Senate by a Senator from Missouri a week or two ago, authorizing certain citizens of New York to set up on the steps of the Sub-Treasury in that city four statues, of Washington, Livingston, Hamilton, and Jay or Clinton, which was duly referred to committee. There is no visible reason why the intervention of Congress should be invoked for this undertaking, inasmuch as the Supervising Architect, with the consent of the Secretary of the Treasury, has authority in the case, and Congress has really no concern in it. It appears, however, that at the same time a bill is before Congress, introduced by a Representative from Missouri, which directs the Secretary of War to contract with a sculptor for a monument to the late General Custer. It appears that the "distinguished sculptor," whom we quoted before as the author of the project for the four statues in New York, is the one specified in the bill in favor of the Custer monument; and that a letter from the same distinguished sculptor was presently laid before the committee of twenty-five appointed by the New York Chamber of Commerce to consider the monument, inviting them to appoint a committee to act with the Citizens' Committee and carry out the project authorized by the bill before Congress. The committee, however, seemed not to fancy being handed over to the scheme of the other party, and gave notice of their intention to paddle their own canoe, in support of which Mr. Chittenden, of New York, has introduced a bill into Congress authorizing the Chamber of Commerce to set up a statue or group in memory of Washington on the front of the Sub-Treasury in New York. It is one of the lamentable conditions of art in the United States, that any movement that is started in favor of a work of public adornment is straightway captured in the interest of some distinguished artist, in a way that necessarily repels from it the interest of other distinguished artists and of the considerate public as well.

GOVERNMENT TESTS OF WROUGHT-IRON AND CHAIN-CABLES.[1] I.

THE original report, published by the United States Government in 1879 as part of Executive Document No. 98, House of Representatives, Forty-fifth Congress, Second Session, was an octavo of two hundred and sixty-seven pages, with thirteen heliotype-plates, and several wood-cuts. This abridgment has only one hundred and nineteen pages; but we judge from the preface that the contraction is due, mainly, to the omission of many detailed articles, not necessary to a full comprehension of the conclusions.

The compiler has done a good work in placing these experiments, and the conclusions deduced from them, within reach of many to whom the original work would be inaccessible. We have here the most elaborate record of tests of wrought-iron and of chain-cables that has ever been published; and even where the experiments are inconclusive and unsatisfactory, they point out the path for future research and investigation.

The first pages are devoted to the record of a very full set of experiments upon the round rolled bar from which the cable is made. Nearly two thousand bar test-pieces were tested to destruction by the strain of tension, over fifteen hundred by the strain of percussion, and nearly five hundred cable links, made in all respects as for service. The tension tests were made by the "chain-proving machine" at the Washington Navy Yard, and by the "Rodman Dynamometer." Prior to Kirkaldy's experiments the tenacity of iron was ordinarily expressed in the strength per square inch of the sectional area of the test-piece before its form has been changed by stress. Since his time the area of the fractured surface has become an important element, and the amount of elongation is always carefully measured. These experiments show, however, that mere percentage of elongation is of little value, unless the length of the test-piece is also known. Three pieces of the same bar, having lengths of 75, 20, and 10 inches, were elongated 18.64, 21.8, and 22.2 per cent before rupture. The strength also varies with the length of the test-piece, and it is recommended that none be used whose length is less than four diameters. On account of the difficulty of measuring with accuracy the fractured surface, the least diameter of the test-piece at the stress which marks the highest point of resistance to continually increasing strains is carefully noted, and the corresponding stress is called the *tensile limit*. If the specimen had rested, it would have recovered from its temporary weakness; whereas, if the stress be continued, the bar is so much weakened that it would break under a much less stress.

The strength of round bars is shown to bear a direct relation to the amount of reduction in area from that of the piles from which they were rolled. The smaller the percentage of reduced area, the greater the tenacity. The effect of working is thus stated: "The indications are that if a bar is *underheated* it will have an unduly high tenacity and elastic limit, and that if *overheated* the reverse will be the case; further, if *underheated* the strength obtained by a cylinder turned from the core will be less than that which would be obtained by testing the entire bar, if the diameter be small, and greater if the cylinder is turned from a large bar."

The experiments made to show the effect produced by the form of the test-pieces are very instructive and quite conclusive. The tests made upon cylindrical pieces having given results of tensile strength and elastic limit so low that the manufacturers were dissatisfied and expressed doubts of their correctness, an examination was made, leading to the discovery that the larger results had been obtained from test-pieces turned from the bars to a reduced diameter, which, at one point, was reduced by a groove to a much less one. The stock of contract-chain on hand, all of which had been considered to be of tensile strength, of sixty thousand pounds per square inch (the standard of the British navy), was then tested by means of grooved pieces and short cylinders. None of the cylinders came up to this standard, and the grooved pieces exceeded the cylinders in tensile strength by from fifteen to twenty-six per cent. This difference is greater in pure refined iron than it is in coarse material. Similar tests were made upon the various kinds of cable iron, giving in every case higher figures for the grooves, and leading to the general law that test-pieces should never be less than four diameters in length. By another series of tests it was proved, in seventy-two per cent of the trials, that bars were stronger in their normal state than when turned down to the same area from larger bars, the excess rising in one case to five per cent. This applies to small and medium bars which are well worked. In large bars the law would be reversed, as stated in the remarks upon *underheating*, and if a two and a quarter inch bar were computed from the tested strength of its core, it would probably be overestimated.

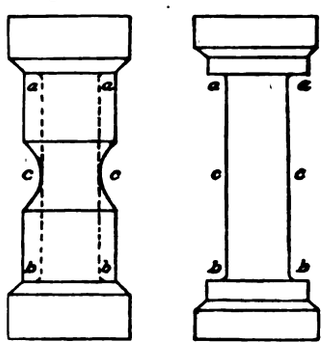

Fig. 1

Having determined the comparative value of the various irons with respect to their resistance to direct tension, it remains to investigate their power to resist sudden strains applied transversely. This test is made by impact. A cast-iron hammer, of one hundred pounds weight, having a wedge-shaped impact surface on its lower face, traverses two vertical rods, and can be made to fall through various heights up to thirty feet, doing a maximum work of three thousand foot-pounds in one blow. At the foot of the rods is the anvil, a cast-iron block with a cylindrical opening eight inches in diameter. The test-pieces, not less than twelve diameters in length, were placed across the hole in the anvil, with their centres under the wedge-shaped hammer. When the iron offered a resistance beyond the limits of the machine, it was weakened by a circular score one thirty-second of an inch deep. The wedge is so shaped as to allow the bar to bend through an angle of one hundred and twenty degrees. These tests show that iron with high tensile strength has comparatively little resilience; it breaks with small deflection, the fractured surface is smooth as if the bar had been cut with a knife, the ends of the fibres showing, like steel, a fine, slightly granulous surface.

A material which proves brittle under this test is not suited for cables. Also, an iron whose entire strength depends upon its remaining perfectly free from abrasion, or slight cracks, is unsuitable. A large quantity of such iron, which had been furnished to the government under contract, was found weak when subjected to the impact test. It was good material, but very little work had been expended upon it. When reworked and piled with old boiler-iron, the product was pronounced "at least equal, if not superior, to the best commercial iron, at less cost." The appearance of the fracture in the same bar will vary materially with the character and amount of the force by which it is produced. It is necessary to know *how* the bar was broken. Only one case was found in which crystallization was probably produced by alternations of severe stress, sudden strains, recoils, and rest. This was in the connecting rod of the chain-prover, five inches in diameter, which had been in use forty years. It had been repeatedly subjected to stress of 250,000 pounds, and broke under a stress of less than 200,000 pounds, the fracture showing "well defined crystallization, the facets being large and bright as mica."

Professor Thurston's discovery, made by his torsion-tests in 1873, that wrought-iron, after having been subjected to a steady stress up to the point of its ultimate strength, would, if then released from stress and permitted to rest, experience an elevation in both its elastic and tensile limit, has been repeatedly brought before the public. Commander Beardslee appears to have, independently,

[1] Experiments on the Strength of Wrought-Iron and of Chain-Cables. Report of the Committees of the United States Board appointed to test Iron, Steel, and other Metals, on Chain-Cables, Malleable Iron, and re-heating and re-rolling Wrought-Iron. By Commander L. A. Beardslee, U. S. N. Revised and abridged by William Kent, M. E.

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made the same discovery, a short time after, while carrying on an investigation by tension. The report before us contains an account of a very instructive series of experiments under this head, but want of space obliges us to pass by these, with the single remark that the effect is most marked upon ductile, fibrous metal. In a series of experiments with two sets of test-pieces, one cut from bars in their normal condition, the other from the same bars after they had been pulled asunder by tension, the gain in strength rose as high as 39.9 per cent. There was a decided gain in every case where the material could be classed as wrought-iron, none when it was steel.

PROCEEDINGS OF THE THIRTEENTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS. I.

Held in New York, November 19, 1879.

First Day. Morning Session.

The Convention was called to order by the President at ten A. M.

By request of the Committee of Arrangements, the chair was authorized to appoint at once special committees, to whom might be referred the various subjects presented to the Convention, and committees were appointed: On Membership; By-Laws; Finance; Meetings of Annual Conventions; Election of Officers and Standing Committees; and a Schedule of Professional Charges.

Mr. Hyde, President of the Equitable Life Assurance Company, welcomed the Convention in a few pleasant words, after which Mr. T. U. Walter, President of the Institute, delivered his Annual Address.

The Secretary read the report of the Board of Trustees, printed copies of which had also been distributed among the members of the Convention, in order that their attention might be better called to its suggestions.

The Treasurer's report was read by Mr. Hatfield, and referred to the Finance Committee.

Messrs. Stone and Le Brun were designated Auditing Committee.

Chapter reports were next read, the Albany and Cincinnati chapters alone failing to send any.

On suggestion of the Committee of Arrangements, the next regular business, the election of officers, was postponed, to allow the reading of papers, the first presented being by Mr. Baumann, C. E., of Chicago, on the subject, "The Proper Distribution of Weights to Secure Equal Pressure on Foundations in Soft Soils."

The Convention, after listening to this paper, which was read by Mr. Stone, voted the thanks of the Institute to Mr. Baumann.

Professor Russell Sturgis, of the College of the City of New York, followed with some remarks on the course of architectural study recently established and conducted by him in that college.

After explaining that his course was not in any sense such as would be given in a professional school, but was simply an elective or optional branch of the regular undergraduate curriculum, Professor Sturgis said that, following the method recognized as most efficient in teaching sciences or art, of beginning with practice, and introducing theory afterwards, he devoted the first of the two years through which the course extended to instruction in the simplest kind of drawing, such as is understood by the term "architectural drawing," calling the attention of students particularly to the nature of the diagrams by means of which forms are expressed for the use of builders. For instance, sketching in perspective on the blackboard a window with lintel of stone, and corbels in the jambs under the ends of the lintel, and assigning the dimensions of the several parts, he would require the class to construct the plan, section, and elevation of the window, explaining to them how these drawings would be understood alike by workmen of all countries, and wherever they might be sent for execution, the windows built from them would be the same. Following out his endeavor to realize in the minds of his hearers that which the drawings represented, he would, for example, insist upon the constructive necessity for the employment of the ornamental corbels under the ends of the lintel, which, being shown rather short, would otherwise have too small a bearing on the jambs. If the objection was made that lintels of any length could be procured in New York, he would reply that his window was to be built in New Jersey, where the material for the cut stone work must be found in the boulders dug out of the cellar, and the dimensions of these limited the length of his lintels, so that being only able to procure a stone five feet four inches long to span an opening five feet wide, and this plainly leaving too little bearing on the jambs, he was obliged to use corbels to diminish the span and increase the bearing. He would then point out how all purely architectural motives of decoration sprang in a similar manner from constructional necessities. This was a very simple exercise.

The next thing would perhaps be the use of the arch, and the students would be shown how the opening being still a little wider, or the available materials still smaller, it would be necessary to abandon the lintel, and resort to arch construction as the only ready means of spanning the opening in question. The definition of an arch then coming up, he would call attention to the difference between the engineer's and the architect's use of the term, following this by exhibiting cartoons showing the many forms of arches, in every case referring to the building in which the particular form was found, and dwelling especially upon the constructional character of each.

The technical terms Professor Sturgis especially insisted upon. To understand the whole scope and bearing of the commoner technical terms used in building was to understand a great deal about building itself; to know all that was implied in the words "archivolt," "entablature," "architrave," and the like was to understand a great deal about the edifices in which those members were found, and about the styles which chiefly employed them.

Other arts than architecture were discussed during the junior year merely as they were used to assist in architecture, that is, in the decoration of buildings. Of course, all other arts in the great periods clustered themselves around that of architecture, even the decorative designs of pottery and jewelry submitting to the influence of the architectural art of the same epoch, but in the first year of the course there was little opportunity to insist upon any arts not immediately connected with building. In the second or senior year, it was, however, practicable to take a wider range, taking up the allied arts of the most important successive periods. He began with Egypt, continuing, with the endeavor to illustrate at all times as fully as possible, through the art of Greece and Rome to that of Europe between the tenth and sixteenth centuries. The isolated forms of artistic expression, as those of Assyria and Persepolis, he passed over with brief mention, it seeming to him more important to enlarge upon the unbroken and inevitable growth of European art than to turn aside to outlying schools, however interesting. He found difficulty, as was to be expected, in bringing to the comprehension of students the qualities and merits in the arts of the past which are almost unknown in those of the present day and especially in American art, while our country was, moreover, devoid of any remains of the art of a better period. To supply as far as possible this deficiency, he collected all the illustrations and examples which could be obtained, and thought these of far more use in elucidating what he wished to point out than any possible verbal explanations.

The college possessed a valuable collection of casts from antique sculpture, and he was so fortunate as to be able himself to supply upon occasion a considerable amount of illustrative material from his private collection, supplemented by loans which were kindly made him for the purpose. To make this illustrative material of the utmost use, he found it well to cause the students to draw, for instance, several examples of Greek vases, one at least of each particular form, and make a note of its essential characteristics.

In this way, connecting the theory with the history of art, the second year of the course was spent. He found it interesting and useful to show how, in the transition from one style to another, the point of view from which art is considered, and nature as represented by art, changes, and observed in his classes even now a singular and instinctive difference in the way in which the point of view, or mode of looking at art, of a given race in the past, recommended itself to minds of different nationality in the present day. For example, he uniformly found the Hebrews, who formed a considerable portion of his pupils, inclined to prefer the art of the most ancient times. The early Renaissance, or mediæval art, had no attraction for them, in comparison with the tranquil and restrained design of the classic ages. Even in color, their preference, if they showed any, was for the Egyptian polychromy, or the patterns of the more modern Orientals, rather than the decorative painting of the Middle Ages, or modern Europe.

A vote of thanks was passed for Professor Sturgis's interesting remarks, and Mr. Lewis W. Leeds then read a paper entitled "Proportion of Inlet and Outlet Shafts in Ventilation."

The President then presented to the Institute, on behalf of Mr. McArthur of Philadelphia, some models of details and sculpture for the new city building in Philadelphia, for which the Convention returned a vote of thanks, after which it adjourned to the following day.

HOUSE LOTS IN ENGLISH AND AMERICAN TOWNS.

Why do shallow houses and lots prevail in English towns and cities, while deep lots and so deep houses prevail in American towns and cities?

A sufficient reason for the prevalence of shallow lots and so of shallow houses in English towns, as compared with what is common in America, seems to be found in the difference between owning and renting land. If we own land all futures seem not impossible to it, and its possible prospective value tempts us to possess and hold it. But with rented land it is only its present use, and its value to ourselves for the time, which concerns us. The value of a vacant bit of ground is not enhanced or lessened to him who rents it for a carpet-beating ground, or a clothes-drying yard, or for a playground for his children, whether it will one day command a great price as a building site or the reverse. A deep lot is thus a temptation to the land buyer, when it is no temptation to the land renter. The one buys often for a small sum what may ultimately yield him a fortune. The other pays out, at its full worth to him at the time, for all he makes use of; and so he is inclined to manage with the least amount of space possible, so as to pay less rent and keep back money for other uses. Experience shows that people will often decline the loan of property which they would be glad to accept the gift of. If this is true of a loan, a letting without a compensation, it is not surpris-

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ing that it is true of a lease, a letting for which a compensation must be paid.

Of course other causes may have influence on the form of lots in England, as everywhere, such as the origins of cities, their having once been walled towns or camps, for instance, as has elsewhere been noticed; and there are old towns in England, and old parts of towns, where the influence of such causes may still be factors in the history of the shape of some of the lots to be found in them; but this does not apply to new English towns and to the new parts of old English towns. Again, a custom and a fashion in building may have an influence where the causes that lead to such fashions no longer exist; but we need not go to anything so remote to explain why shallow lots prevail in cities where the land on which most dwellings stand is not owned by, but is only rented by, those who live in them. Those who rent such dwellings do not care to pay rent for more land than just enough for their house to stand on and, in addition to it, only just as much yard room as they may think they actually require. Thus we see, in England particularly, where large pieces of land are laid out in city lots by great landed proprietors, shallow lots, as compared with our prevailing American standards. From this we see how great landholders in our American cities, if freed from our present deep-lot system (a system which is working in the interest of the real-estate speculator, and often to the interest of the buyer of land, but working against that of the renter, and so of the permanent letter of land), could, by following the example of the great English owners of land in towns, let their land to still better advantage than at present; and yet, so long as they retained the ownership of it, still be in a position to advantage by every possibility of the future. When a lot is sold the right of way to and from it, through the street on which it stands, cannot be taken away from it. But when a lot, or a house and lot, is rented, the like right of way can be taken back when the lease has expired, and a new deed of land can be made, should changed circumstances call for it.

Just as the renting instead of the buying of land leads to a demand for shallow rather than for deep lots, so does it lead to lots so shallow that there is no room on them for space other than just that covered by the house. And, though such lots are now rare, yet as yards in modern times are becoming less and less needed adjuncts to houses, so, in new cities, sooner or later, and in the case of rented property, where the large land owners are left free to consult their best interest, very soon, will a private yard to each dwelling be less and less the rule, and houses running through from street to street will become the most usual. And yet these houses, running through from street to street, will be shallow houses; for the same influences governing English landlords and land owners now, not only in laying out town lots, but also in the form of the houses built on them, will govern such American lots and the houses built on them. For not only is the English tenant reluctant to rent a deeper lot than will just suffice, along with a sma'l yard, for his house to stand on; but he is also reluctant to rent a house deeper than he can live in to advantage. He wisely wants the house-room he pays rent for so disposed that it will give him the most health and comfort and pleasure possible. And, so far as he understands, or fancies he understands, what most conduces to that end, so far he will be influenced by those considerations in making choice of a house which he will rent. The advantages of cheerfulness, light, and air, possible sunshine and prospective health, which a shallow house has over the gloom, and want of air and light, and over the prospective unhealthiness of an over-deep one are so apparent, when an opportunity is given to compare them, that it is only because such opportunity is lacking in many of our American cities that the present unhappy state of affairs in them, evidenced by that fact, is allowed to continue. At present, in England, shallow houses, as well as shallow lots, are the rule; and a family of moderate means can get a house, of any desired size, every part of which is light, cheerful, and well-ventilated; a house combining every convenience desired, and built with every attention to sanitary requirements, so far as at present understood, and at a rent which, compared with rents in American cities, seems trifling. But that which can be had in England everywhere, at a low rent, cannot be had in some American cities at any price.

Yet as habits of living are much the same in England and America, and as in both countries the majority who rent houses cannot afford to rent large and expensive ones, there is the same need in both countries for small houses arranged so as to combine the highest sanitary advantages while occupying but little ground. Unfortunately for landlords and tenants the dividing up into lots of the ground in American cities is influenced, not by the needs of householders and tenants, but by the great cost of street making, the comparative cheapness of unimproved land, and the ease and cheapness with which the ownership of land can be conveyed, and it simplifies dealings in lots to have all lots of one size. It stimulates purchasers to have the lots large. It diminishes the cost of street making to each lot, the more lots there are having a frontage on a given length of street. Thus we see all our new towns laid out in narrow and deep lots, and most often in lots larger than experience has shown, both in England and in the older American cities, are wanted for the majority of rented houses. This is unfortunate for landlords and tenants just in proportion as their interests differ from those of the town lot speculator. Wherever in America, land owners, whether owning large or small parcels, are free to do so, and where land is purchased for use, rather than for a prospective rise in value, we see them adopting other systems of dividing land than that just named, and we find a great variety in sizes of lots obtainable, and find smaller lots prevailing.

This is best accomplished in Philadelphia. Houses in that city are mostly owned by their occupants, and while deep lots are common, lots of all sizes are procurable, and small lots prevail. The system of dividing lots to suit varying needs, which works well for owners of houses, works well for landlords and tenants also. But on the other hand, where, as in New York and the cities or parts of cities planned in imitation of New York, an inflexible system prevails, by which lots other than what were once thought most convenient in size and shape are still unprocurable, we find a lack of such lots, and so of such houses, as the interest of landlords and tenants elsewhere calls for.

The lots in New York being all laid out one hundred feet deep each, shallower lots, on which shallow houses, such as are light and cheerful and well ventilated in every part, can be built with economy, are unobtainable, notwithstanding that such houses are those which are most in demand, not only in England but in every city, English and American, where they exist. This, which hampers owners of single lots, need not hamper, however, those who have large parcels of ground still to be improved. It is to the interest of those who would have houses to rent to supply those which will rent most readily; and, where they have large pieces of property to lay out, to study the methods which have been found most profitable in England, where the renting of dwellings most prevails. And should such studies, like the present, lead to the iteration of ideas already put forward, that only evidences, to thoughtful minds, the value of those ideas, and the importance of reiterating them until their value is perceived not only by the few but by the many.

HOUSE-BUILDING TWO CENTURIES AGO.

[We think the following letter, which we quote from the Massachusetts Historical Collections, will be of interest to our readers. It was addressed to the son and namesake of the famous Governor Winthrop. The date assigned to it is 1637.]

To the Right Worshipfull his much honored brother John Winthrop of Ipswich, Esqr: speed this I pray.

Good Sir, — I have received your lettre, I thanke you for it: it hath bin my earnest desire to have had an oportunity longe ere this to have bene with you againe, but was hindered by the weather, and still my desire lasts, but now I cannot by reason that my wife her tyme draweth very neare. Concerneinge the bargaine that I have made with you for Argilla, my wife is well content, & it seemes that my father Peter hath imparted it to the Governor, who (he tells me) approves of it very well, alsoe, soe I hope I shall now meete with noe rub in that businesse; but goe on comfortablely, accordeing as I have & daily doe dispose my affaires for Ipswich. Concerneinge the frame of the howse, I thanke you kindely for your love & care to further my busines. I could be well content to leave much of the contrivance to your owne liberty vpon what we have talked together about it already. I am indifferent whether it be 30 foote or 35 foote longe; 16 or 18 foote broade. I would have wood chimnyes at each end, the frames of the chimnyes to be stronger than ordinary, to beare good heavy load of clay for security against fire. You may let the chimnyes be all the breadth of the howse, if you thinke good; the 2 lower dores to be in the middle of the howse, one opposite to the other. Be sure that all the dorewaies in every place be soe high that any man may goe vpright vnder. The staiers I thinke had best be placed close by the dore. It makes noe great matter though there be noe particion vpon the first flore; if there be, make one biger then the other. For windowes, let them not be over large in any roome, & as few as conveniently may be; let all have current shutting draw-windowes, haveing respect both to present & future vse. I thinke to make it a girt howse will make it more chargeable than neede; however, the side bearers for the second story being to be loaden with corne, &c. must not be pinned on, but rather eyther lett in to the studds or borne vp with false studds, & soe tenented in at the ends; I leave it to you & the carpenters. In this story over the first, I would have a particion, whether in the middest or over the particion vnder, I leave it. In the garrett noe particion, but let there be one or two lucome[1] windowes, if two, both on one side. I desire to have the sparrs reach downe pretty deep at the eves to preserve the walls the better from the wether, I would have it sellered all over, & soe the frame of the howse accordengly from the bottom. I would have the howse stronge in timber, though plaine & well brazed. I would have it covered with very good oake-hart inch board, *for the present*, to be tacked on onely for the present, as you tould me. Let the frame begin from the bottom of the seller, & soe in the ordinary way vpright, for I can hereafter (to save the timber within grounde) run vp a thin brickworke without. I thinke it best to have the walls without to be all clapboarded besides the clay walls. It were not amisse to leave a dore-way or two within the seller, that soe hereafter one may make comings in from without, & let them be both vpon that side which the lucome window or windowes be.

I desire to have the house in your bargaineing to be as compleatly mentioned in particulers as may be, at least soe far as you bargaine for, & as speedily done alsoe as you can. I thinke it not best too have

[1] Lucarne or Luthern.

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too much timber felled near the howse place westward, &c. Here are as many remembrances as come to minde. I desire you to be in my stead herein & what euer you doe shall please me.

I desire you would talke with Mr. Boreman, & with his helpe, buy for me a matter of 40 bushells of good Indian corne, of him or of some honest man, to be paidd for now in ready mony, & to be deliuered at any tyme in the sumer as I please to vse it. I would deale with such a man as will not repent if corne rise, as I will not if it fall. Thus acknowledging my bouldnes, I desire to present our respectfull love to you, my sister, & your litle one, not forgetting my daughter. I cease, committing you to him that is mercy & wisdome it selfe, and soe rest Yours ever, S. Symonds.[1]

My wife desires her spetiall love to be remembered to you both, & to let you vnderstand that she is very glad that she shal be your neighbour at Ipswich.

I have herewith sent you inclosed 50*li.* for yourselfe, in part of payment, as my father Peter willed me from you to doe, & twenty pounds more to be disposed in corne to workemen as you please; & for the payment for the rest, as you are willing to let my father Peter set downe the tyme, soe am I.

My wife & I desire to be kindely remembered to your good neighbours, Mr. Boreman & his wife & the rest of our frends. I could haue wished he had written one word by Mr. Tuttell how those 3 bullocks be disposed of. Our desire now is to hasten to Ipswich as fast as we can, at least our servants.

I heare that your Church hath setled the choyce of your ministers in their offices, & that now things are likely to goe on very well & comfortablely, which ministers matter of great ioy to all that love Jesus Christ. And truely the peace of any Church (because pretious) is soe difficult to preserve, in respect of the subtilty & mallice of the common enymy, that it requires answerable cautelousnes on all hands, every one waighing well that one sentence of the Apostle, Let every one esteeme an other better then him selfe, & studdy the vally-way to rise to true honour.

THE ILLUSTRATIONS.

SKETCH FOR THE NEW YORK INTERNATIONAL EXHIBITION BUILDING, 1883. MR. WILLIAM G. PRESTON, ARCHITECT, BOSTON.

The site proposed, as shown by the diagram, is at the upper part of New York city, just above Central Park, between One Hundred and Tenth and One Hundred and Twenty-fifth Streets. The ground is an elevated plateau, about 150 feet above the level of the Hudson River, and from it the views up the river are very beautiful and extensive. With sixty feet of water at low tide at the piers beside the grounds, the largest foreign steamships may bring their freights literally to the doors of the exhibition building, and by means of travelling cranes running out over the decks the goods can be set in place with absolutely no extra transportation. The facilities for reaching the exhibition consist of ferries, horse-cars, river steamboats, the Hudson River Railroad and all its connections, and the Elevated Railroad, which now runs up as far as the Harlem River (One Hundred and Fifty-ninth Street), and by that route a visitor can leave the site and in twenty minutes be at the St. Nicholas Hotel. No exhibition has ever been held in a location having anything approaching the advantages offered by this; but the plan of building proposed could be readily adapted to any site sufficiently large. The leading idea determining the principal characteristic of the building is not novel; on the other hand, the classification and general arrangement of exhibits at the Paris Exhibition, 1867, seem to have met with general approval.

As will be seen, the drawings are merely suggestive of a plan which offers space, economy, classification, and convenience. The oval form of the French exhibition building has been adopted, but enclosed within an oblong structure. The special advantages of the French system already recognized are that while all important departments are covered by one roof, they are so arranged as to be studied either by countries or by subjects as the visitor may prefer: in the first case walking from the outer edge to the centre, and so remaining in one country; and in the other case following the product, raw or manufactured, concentrically through all countries. The plan as shown indicates an area within the straight lines of the building of 110 acres: of this amount 25 acres are devoted to the proposed park enclosed by the oval. Herein should be the art gallery, perfectly isolated and secure from any danger from fire. The distance around the oblong building is one mile and three fifths; the total length of the concentric walks, about twelve miles. An internal railroad 7,200 feet long (nearly one and a half miles) is proposed, to be run by compressed air. Arrangements to be made for eight stations in the circuit, all connected by electricity, so that eight trains would follow one another, making a stop of a half minute at each station. The outside square structure of the building may convey the idea of grace, magnitude, and dignity, while the interior curved portion being simply for the preservation and shelter of exhibits, and being seen only from within, the addition of purely ornamental features would be superfluous. Four spandrel-shaped spaces, of about three and a half acres each, are left at the interior angles of the oblong. It is proposed to utilize these for separate buildings, indicating Europe, Asia, Africa, and America, affording an opportunity for typifying the architecture of the four quarters of the globe, and for landscape gardening, decoration, and for pleasant light-and-air spaces. In the centre of the enclosed oval it is proposed to place the art gallery, a building of brick, terra-cotta, and iron, decorated with polished granite and bronze, and intended to remain as a permanent memorial. This would be a hollow square 300 by 300 feet; each side of the square about 65 feet, and with a dividing wall running parallel to the outside walls of the building.

About 50,000 square feet of wall-space would be secured on the second story, which, having largely top-light, could be given up to paintings. The first story would be devoted to sculpture, engravings, cabinet pictures, etc., with side-light. As this building, fire-proof in itself, would be 250 feet from the main building at the nearest point, there would be no hesitation in placing within its walls any available works of art. When the exhibition building should be torn down the art gallery could remain, fronting on One Hundred and Fourteenth Street, as one of the public buildings of New York.

It would probably be financially impracticable to build the main building of so-called "fire-proof" construction, but it could be built with iron framework, planked roofs, and mill floors on the "slow-burning" plan.

At the northern portion of the grounds may be placed such buildings as it would be impracticable to include within the main building, such as the conservatories, cotton-mill, iron foundry, gasometer, steam-boilers, etc. The whole exhibition grounds would include an area of some 175 acres.

HOUSE FOR MR. ROBERT FULTON, MONTCLAIR, N. J. MESSRS. SEE & BERG, ARCHITECTS, NEW YORK, N. Y.

This house is now nearly finished.

OLD STAIRCASE IN THE LEE MANSION AT MARBLEHEAD, MASS.

HOUSE OF DR. A. H. THAYER, GRAFTON, W. VA. MR. THOMAS BOYD, ARCHITECT, PITTSBURGH, PA.

The building will be set on a hill commanding a fine view, and will be built of brick and stone. The inside will be finished with hard wood throughout.

ANTIQUE SCULPTURE IN BERLIN.

Most civilized nations try very hard to persuade themselves just now that they take a wide and genuine interest in art. That some of them take a *growing* interest cannot be questioned. But in most of them the individuals to whom art has become a vital and indispensable thing may still be included in a class of specialists more or less professional — artists, critics, and connoisseurs whose whole life is devoted to its service. Only in Germany and only with regard to music do we see an entire people making a place for it among the necessities of ordinary life, appreciating it by instinct and enjoying it without affectation through all the strata of society. We have had concrete evidence during the last ten years of the world's comparative indifference to the arts of design. When we think of the passionate search for relics of classic art in the time of the Renaissance, when we think of the emulous strife for their possession among popes and kings, artists and burghers, humanists, fine ladies, statesmen, and *condottieri*, when we contrast such a popular sentiment with the manner in which we have greeted the discoveries of our generation, — enormous alike in extent, in variety, in rarity, and in absolute artistic worth, — how great the difference! It is a picture as striking as that of Leo X., passionate connoisseur and munificent patron, followed in the Vatican by a Hollander who shuts the sculpture galleries with a scornful "*sunt idola antiquorum.*" Nay, we have not even Adrian's excuse of motived hostility to give for our indifference. It is not our theology which makes us cold to the magnificent recovered relics of antiquity. There has been no time since the Renaissance when so much has been rescued from oblivion as during the last very few years. Not only are our beliefs about the best known periods of antiquity being confirmed on the one hand or corrected on the other, but we are gathering evidence as to periods about which we had known little or nothing. To Etruscan and Cyprian and archaic Grecian finds have been added the Tanagra figurines — testifying to an almost unsuspected phase of ancient art. And while Olympia, the middle point of Grecian life, has yielded treasures beyond the hope of the most sanguine to complete our knowledge of the noblest epochs, from the scarce less classic sites of Asia Minor we are filling the gap between Alexandrine and imperial days. Never, perhaps, except when the British Museum opened to receive the superb stolen goods of Lord Elgin, has so great a treasure been added at once to the possessions of Northern Europe as the museum of Berlin has received of late.

But outside a very limited artistic class how have these discoveries been estimated? How do any but specialists appreciate the labors of Di Cesnola? What would the popular interest in Schliemann amount to, were it not for the added literary zest supplied by the possible value of his Homeric speculations? Can we not guess how the city of Lorenzo or of Leo would have made jubilee over the dis-

[1] Samuel Symonds, a gentleman of ancient family at Yeldham in Essex, and a cursitor in chancery for that county, married, first, Dorothy, daughter of Thomas Harlakenden of Colne, and had ten children before coming to New England in 1637. His second wife was Martha, daughter of Edmund Reade, and widow of Daniel Epps. He settled in Ipswich; was representative in 1638; an assistant in 1643, and by successive elections for thirty years after. In 1673 he was chosen Deputy-Governor; and died in that office, 12th October, 1678. Felt (History of Ipswich, 161-163) makes honorable mention of him. — *Pedigree of Symonds in the Diary of the Marches of the Royal Army, etc.*; *Savage's Geneal Dict.*; *Proceedings of Mass. Hist. Soc.*, 1862-63, 254-258.

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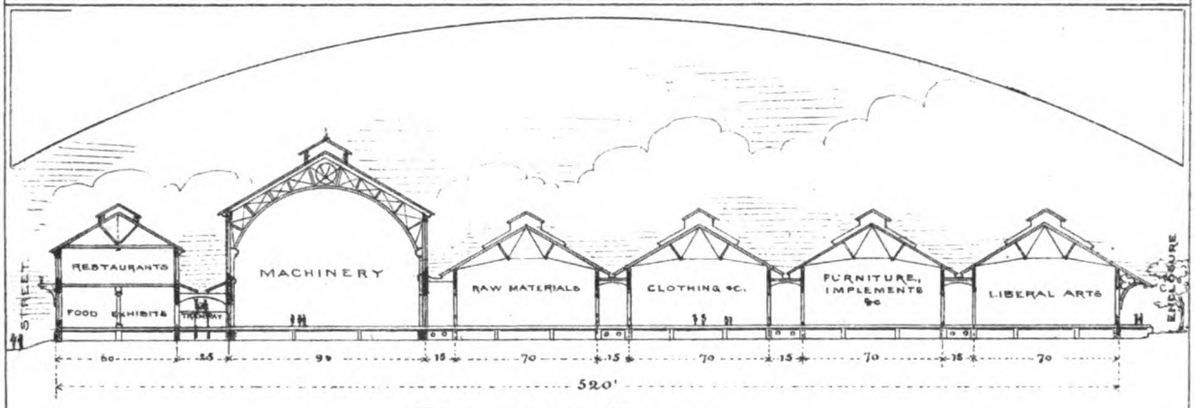
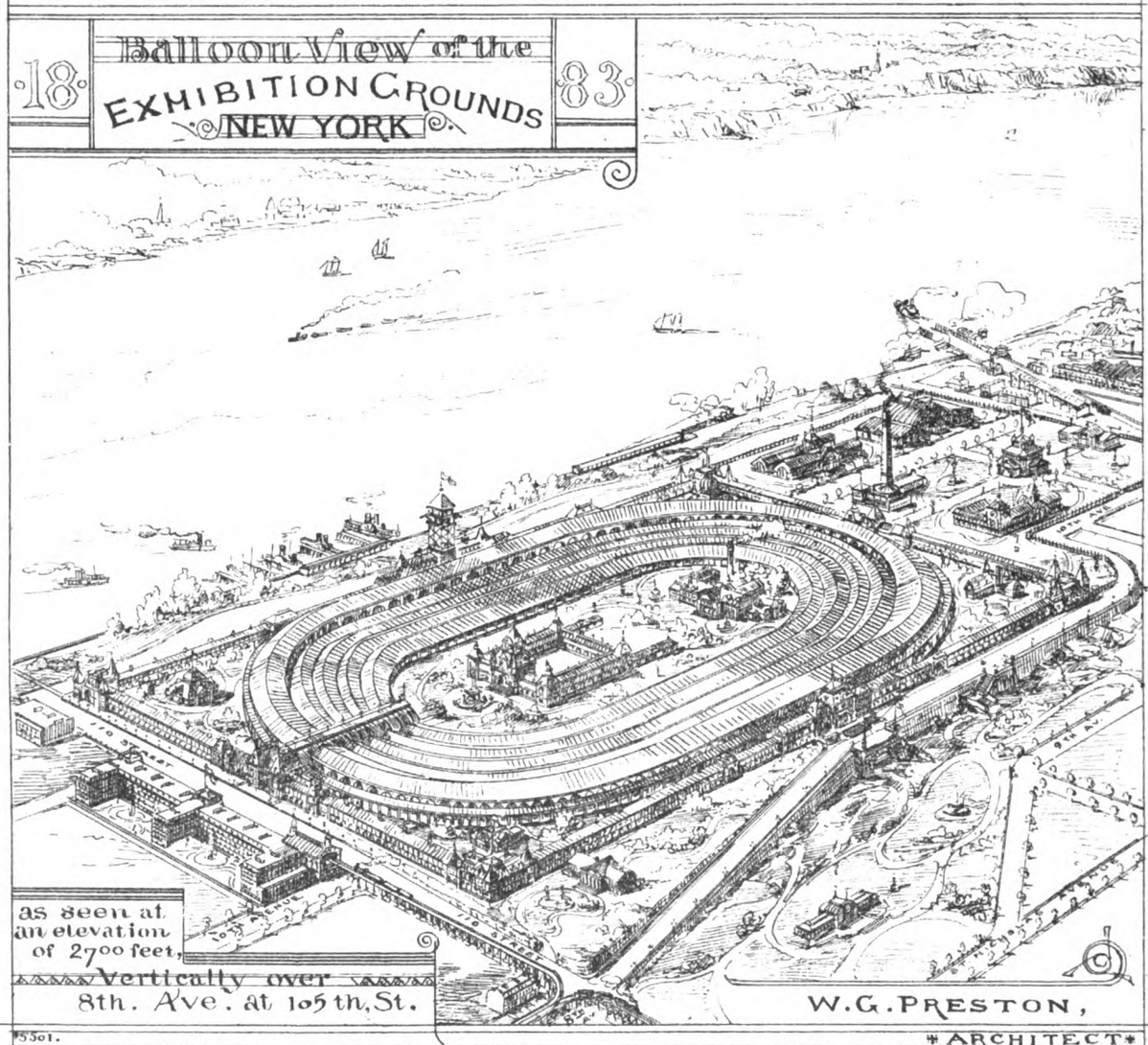
INTERNATIONAL EXHIBITION



TRANSVERSE SECTION
THROUGH ONE SIDE OF EXHIBITION BUILDING
FROM STREET TO CENTRAL ENCLOSURE

18 Balloon View of the EXHIBITION GROUNDS NEW YORK 83



as seen at an elevation of 2700 feet, Vertically over 8th. Ave. at 105th. St.

W. G. PRESTON,
ARCHITECT

5501.

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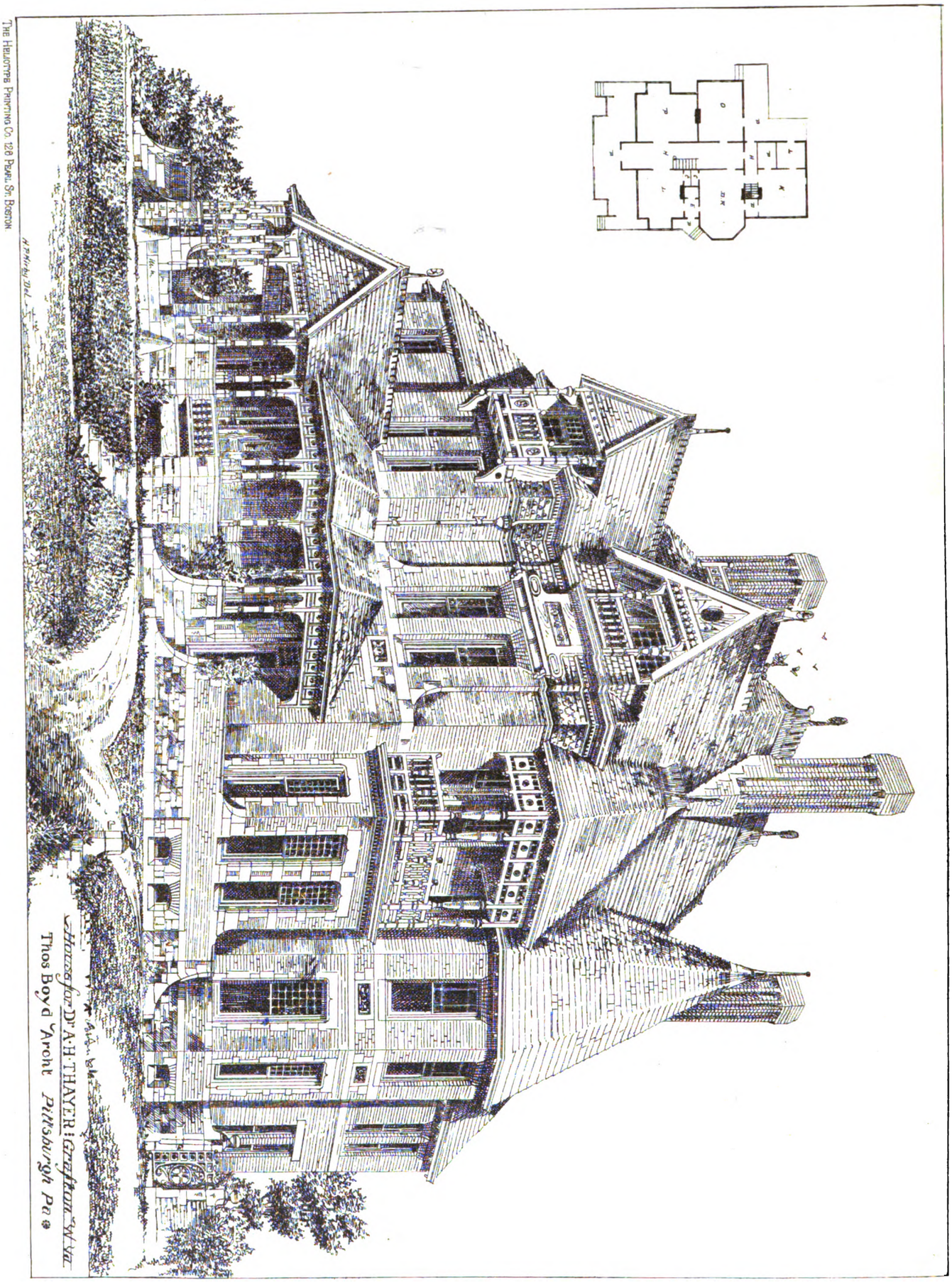

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OLD STAIRCASE in y^e "LEE HOUSE" Marblehead Mass.

Elevation of Side.

Plan.

Scale. 2 feet

Elevation of Pilaster and Paneling opposite Newel.

Detail of Newel.

Scale.

3 6 9 12 Inches.

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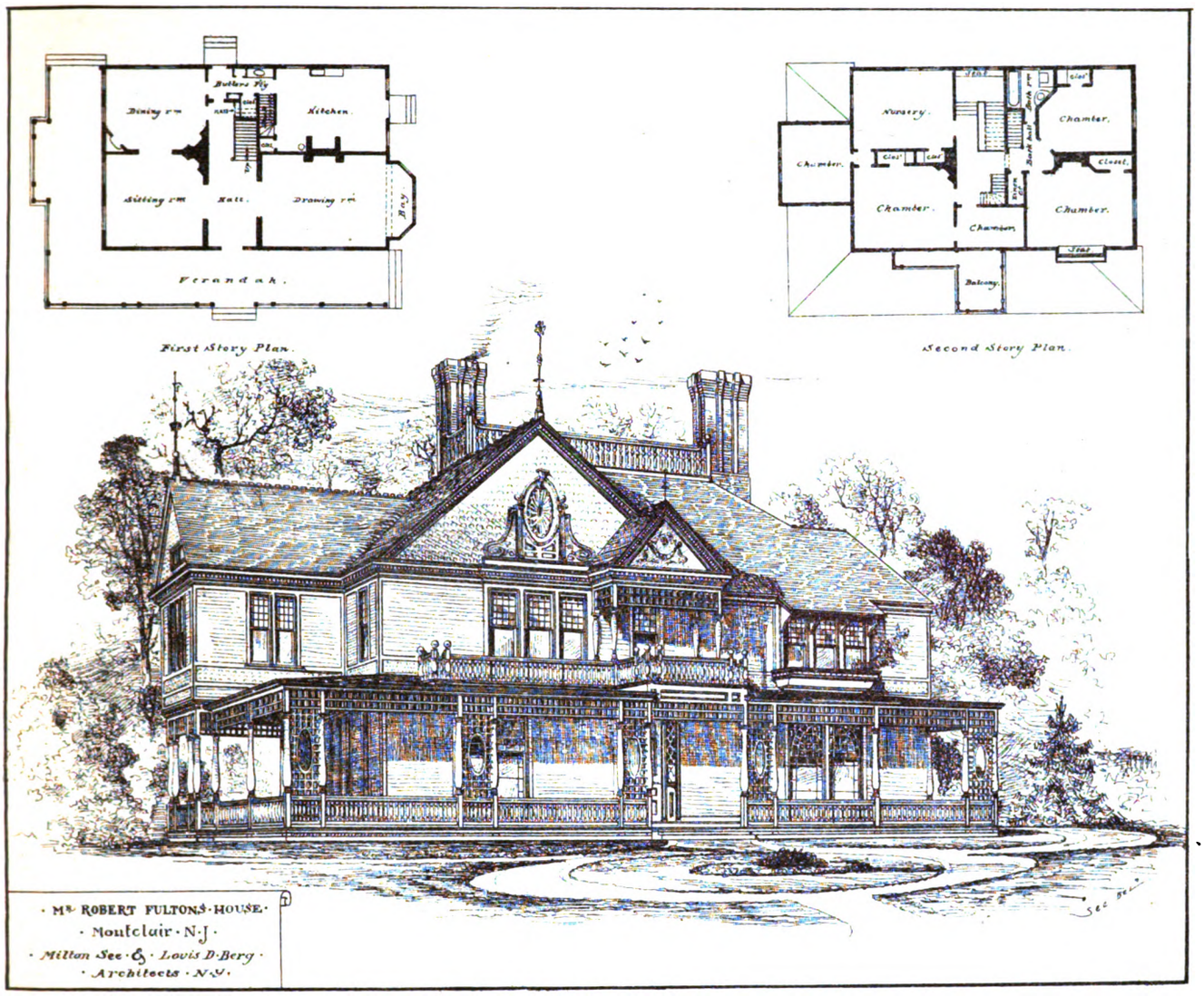

· Mr. ROBERT FULTON'S · HOUSE ·
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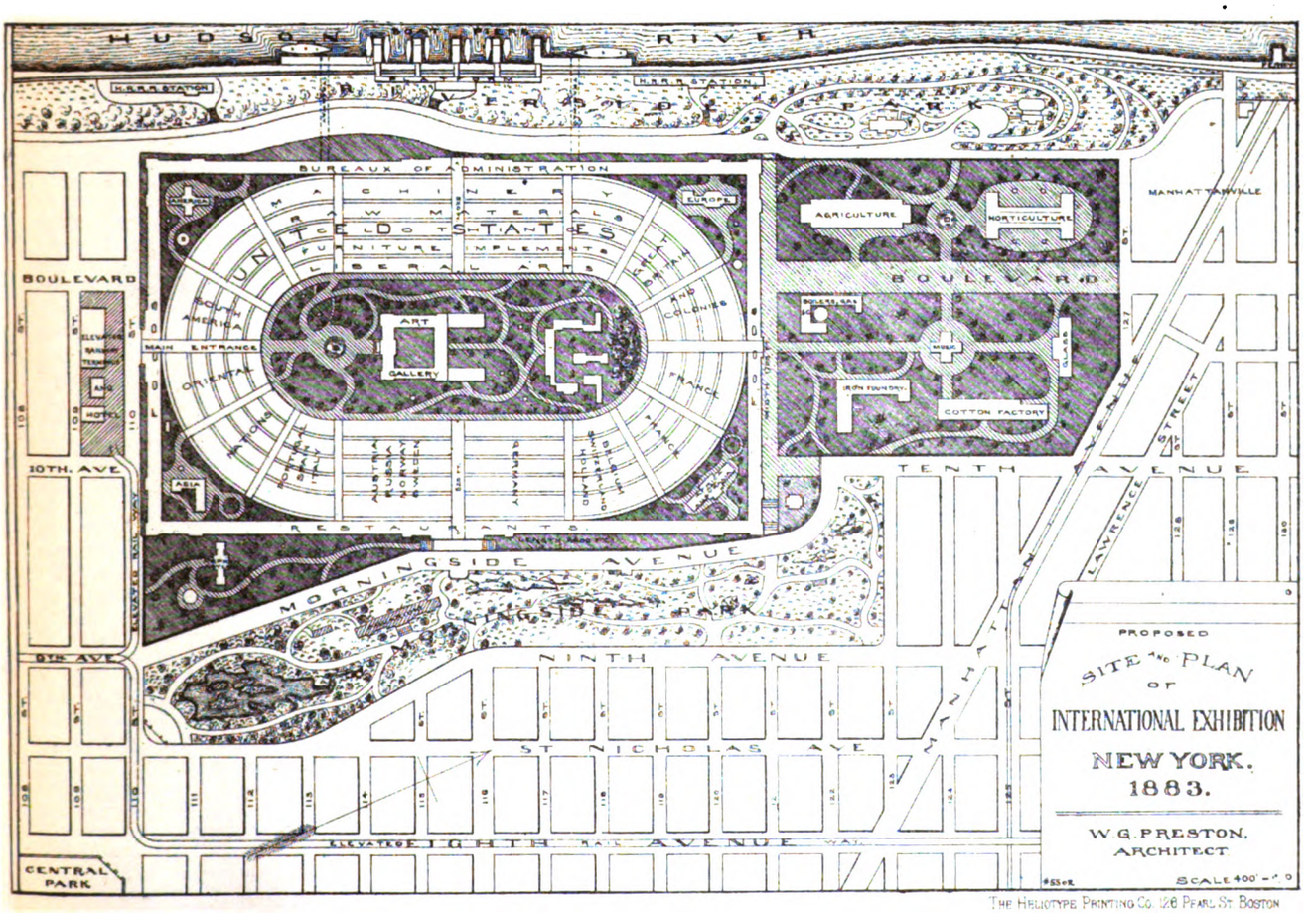
· Architects · N.Y. ·



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covery of an undoubted original, doubly immortal through the chisel of Praxiteles and the pen of Pausanias, or over the advent of even a reproduction thereof such as we have in Boston? And can we not imagine the pilgrims that would have sought Olympia, had it been as accessible to them as it is to the tourist of to-day?

Let me point my words by considering for a moment the results of the very latest finding. A full set of casts from the Olympia sculptures has been sent year by year to Berlin. They are exhibited as nearly as may be in their proper position, and those obtained during the first two years' work have been often described for those especially interested in such subjects, though the general public has still but misty ideas in reference to them. The trophies of the third year, which have just been added, confirm in great part the disposition already made, and supplement it in the most satisfactory way. The third volume of the superb illustrated work describing the explorations has also just appeared.[1] From this book alone, or in conjunction with a fine series of photo-lithographs issued by a Dresden house,[2] one may get a valuable idea of the whole result. It is unnecessary, I hope, to describe again the east gable of the main temple, where we have the handiwork of Paionios — known to us until these discoveries by name alone — or the west gable of Alcamenes, who marks the transition from Phidias to the younger Attic school. The Hermes of Praxiteles and the magnificent colossal Nike of Paionios are the best known to us, perhaps, of all, so we note with satisfaction that the very latest despatches from Olympia announce that the head of the latter has at last been found. The face, unfortunately, is said to be much mutilated.

Till now less has been told us of the second great building of Olympia — of the Heraion — than of all these. It is doubly interesting, nevertheless, as it deviates very greatly from the ways of Greek construction previously known to us. The portico is of unusual plan, its proportion being six to ten, and the columns are of the greatest diversity. Of architrave, triglyphs, or cornice, not a trace has been found, though the temple and its foundations now lie bare. So it is to be presumed with certainty that the archaic wooden construction had been here in part retained. A gradual replacing of wooden by stone supports may account for the diversity of those remaining to us. The Philippeion, a circular building with external columns of the Ionic order, bears a definite date, that of the seventh decade of the fourth century B. C. Among the minor relics discovered are many of archaic workmanship highly valuable as showing the development of Greek art from its Asiatic and Egyptian sources. It has been said that they alone are worth all the trouble and cost of the explorations. Commenting upon them, Herr Bernhard Förster[3] points out how a small bronze figure of Aphrodite fully draped, but in the attitude known to us in such statues as the Venus de' Medici and the Capitoline, proves the exquisite tact with which artists of the classic period could adapt the honored traditions of earlier days. The posture which with them expresses the most delicate modesty was derived from such earlier works as this little bronze, where it was probably one of the symbols of fertility so common in Asiatic art.

Less known to us even than the Olympic treasures are the still later trophies of exploring skill, to which I have referred as being now in the Berlin Museum. They are a magnificent collection of sculptures from Bergame, the ancient Pergamos, and Germany owns them this time not in plaster copies, but in the precious originals. Their discovery and acquisition were due in great part to Herr Conze, whose explorations in Samothrace have already been noticed in this journal. These newer and more important finds are with certainty to be referred to the date presumed by him for the Samothracian relics, to the time of the Diadochi. They are indisputably the chief works of that distinct and famous school of art known to have flourished in Pergamos under the successors of Alexander. Corresponding in time, in importance, and, to a certain extent, in character with the school of Rhodes, the school of Pergamos derived immediately from Lysippus its style and execution, carrying still further than he an excessive refinement of finish as well as a tendency to excited action and passionate or pathetic effects. Its culminating point was in the time of Eumenes and Attalus I., princes of Pergamos, in the middle of the third century B. C. The Rhodian school showed its tendency toward complicated grouping and so-called "picture-like" effects by such monuments as the Laocoön and the Farnese Bull, and the Wrestlers of the Florentine Tribune. But the Pergamian school, while seeking like effects, seems to have drawn its materials very often from local, contemporary life. It found a grateful subject in the wars waged by Attalus and Eumenes against the invading Gauls, and the punishment which they of all the Macedonian princes were the first to inflict upon them. In Athens, still the intellectual and æsthetic centre of the world, Attalus dedicated a monument composed of four distinct but coördinated groups, which showed, respectively, the battle of the gods and giants, the combat of Theseus and the Amazons, the victory of the Athenians at Marathon, and the conquest of Attalus himself over the Gauls. This monument[4] stood by the south wall of the Acropolis, and the traces of its basement, discovered in recent years, measure 50 by 16 feet. Undoubted fragments of its groups are in our possession to-day, — three figures in Venice, all of conquered Gauls; four in Naples, one an Amazon, one a giant, and the others apparently soldiers of Persia and of Pergamos; one in the Vatican, a Gaul; and another similar one in the Castellani collection. From the proportions of the pedestal, and the size of the figures, — somewhat less than life, — it is evident that the groups instead of being ordered on a single plane, like those of a gable, were disposed in a sort of perspective through the sixteen feet of depth possessed by the base. Probably the celebrated groups of Lysippus were built in the same way, of which we have, too, a smaller example in the Rhodian Bull.

It had, furthermore, always been believed that Attalus adorned his own city with a still more splendid memorial, and critics had come of late to regard as fragments of such the so-called Dying Gladiator, — more correctly, Wounded Gaul, — of the Capitol, and the group at the Villa Ludovisi, which bears the equally apparent misnomer of Arria and Pætus. It is this long-presumed monument that has now been actually unearthed at Pergamos by Herr Conze and his comrades. Its substructure has been found, and from an old Byzantine wall have been rescued the fragments of about half the mighty frieze which once surrounded it, many of the slabs being in perfect preservation. The monument seems to have been a sort of huge altar, if we may so call it, measuring 140 metres in circumference at the base, though in what proportion of length to breadth my authority[5] does not state. The frieze, which represents once more the contest of the gods and giants, remains in slabs 2.30 metres in height, and of various lengths. It probably contained in all about 300 square metres, and of these the Berlin Museum possesses 106 square metres, together with some 1,500 fragments of greater or less dimensions. The disposition of the monument, as nearly as can now be gathered, was as follows: The substructure, which supported a peripteral temple, was encircled on three sides by the frieze. The fourth side was occupied by a massive flight of steps leading up to the temple. This last was decorated by another smaller frieze, showing the legend of Telephos, ancestor of the Attalid race. Of this about 30 slabs, measuring 1.57 metres in height by .70 or .90 in length have been received at Berlin, but in December last had not yet been unpacked. In addition, we are told that a large number of inscriptions of the greatest value have been unearthed, together with relics of sculpture of all kinds and of all periods. All of these will, it seems, pass into German possession. Remarkable among them is a female head of exquisite beauty, dating from an earlier, more classic period than the major part of the discoveries, and resembling in style the Venus de Milo.

Fortunately it is the most important portions of the great frieze that have been most perfectly preserved, notably, Zeus himself with the ægis in his hand and the stricken giants at his feet, and the slabs representing Athene, — said to be of exceptional beauty, — Poseidon, Phœbus, Artemis, Dionysus, and Ge, the earth-mother, who, half emerging from the ground, laments the destruction of her sons. The conception of the whole frieze is of the most daring description, showing the wildest rage of battle, and the most complicated anatomical problems. We are told, however, that these difficulties have been dealt with — æsthetically and technically — in a style of consummate mastery. Our authority does not suggest the rôle probably played in the monument by such figures as those I have referred to in the Capitoline and Ludovisi collections, although he notes their probable relation to it. Part of a gable group they could hardly have been. They are equally finished all round, and the Samothracian pediments showed that in the time of the Diadochi this was considered a waste of labor, where the back was not to be seen. Moreover, the foundation slab of each is complete in itself. May we not suppose that if they were connected with the monument it was as parts of perspective groups, such as those erected by Attalus at Athens?

It is too early yet for any detailed criticism and estimate of these discoveries to have been published from competent hands. But even from what we already hear we may conclude that the find is of unexceeded value. Great in extent, and remarkable for preservation, it does us the signal service, moreover, of first definitely revealing an almost unknown school. Art as it existed under the Diadochi had long been guessed at and reconstructed in imagination from scanty remains and literary notices. It is now at last before us, a visible, coherent, and historically important thing.

M. G. VAN RENSSELAER.

[1] Published by Ernst Wasmuth: *Die Ausgraben zu Olympia.*
[2] Römmler und Jonas.
[3] *Im Neuen Reich*, 1879, No. 45.
[4] Lübke, *Geschichte d·r Plastik.*

THE CONDITION OF ARCHITECTURE IN THE WESTERN STATES. I.

ARCHITECTURAL progress in the West has not been the same with all classes of structures; and the reason for this is that uniform architectural talent is not employed on public and private work. As a rule, the public buildings in the West have employed inferior talent, and private ones have had the best available. Therefore, to intelligently understand the present condition of the art, public and private buildings must be considered separately.

Public buildings naturally comprise those erected for state, county, and municipal purposes. Private buildings are mainly for business and residence. Churches form a class by themselves.

With very few exceptions the public buildings of the Western States have been erected within the lifetime of the present genera-

[5] *Im Neuen Reich*, 1879, No. 49 (December).

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tion. Those which are exceptional reflect the tendency, so general in the early days of the republic, to adopt Greek types in architecture, and were carried out in whatever material proved to be handy, without regard to structural propriety. Many of these have been superseded, within the memory of man, by modern structures; and in fact there are no public buildings over thirty years of age which are now suited to the purposes for which they were intended.

The prevalent custom of public architectural competitions has resulted in the selection of architects for these buildings whose talents are below the average. It is needless here to discuss the competition question, except so far as its results are concerned. But it is a fact that very seldom do the best architects enter such contests, and the choice of designs being controlled by men whose only abilities are in the field of politics, it is generally a matter of chance whose design is accepted; and those which please the eye the most are such as happen to be suited to the comprehension of the intellectual mediocrities who sit in judgment on them.

In the styles of architecture employed in public buildings in the West there is as yet no evidence of any tendency toward a national style, of which we see evidences in private architectural works everywhere. To prevent any misunderstanding as to what is meant by national style, I will explain that it is the tendency of a number of architects — whether working in concert or not — to follow nearly uniform principles in construction and design, uncontrolled by the traditions of previously existing styles. I say uncontrolled, though I think they may be *influenced*, a word of less comprehensive import. Of such is the prevalent tendency in domestic and commercial architecture to employ straight lintels placed flush with the walls and in connection with horizontal band courses; also continuous sills and visible bond courses in piers, cornices for wall protection only, and not for shadow effects; and, generally, ornamentation of the *surface* of walls and *within* the surface plane. The design of such buildings, though it has little in common with any historical style, has been largely *influenced* by the study of mediæval Gothic architecture and the works of Viollet-le-Duc, which have had such extensive circulation in this country. I shall have occasion to speak of this tendency of domestic architecture in another place.

The architecture of our public buildings has simply been ringing the changes on the styles of Greece and Rome, but more especially upon those of Rome. The architects call it Renaissance, but it has little in common with the historical Renaissance of Italy or France. It has more in common with the so-called "Italian" of England, which has been in favor from the days of Inigo Jones and Wren to the Gothic revival of our own time. It received its greatest impetus from the erection of Saint Paul's, and its latest from the London club-houses. England never had a Renaissance of classic architecture. She simply copied the works done in that name by the architects of Italy and France. The nearest approach to it was the picturesque combinations of classic details with Gothic forms of the time of James I. and Elizabeth, now called Jacobean, and revived to cater to fashionable tastes. But even that style, if style it may be called, was inspired by the picturesque and artistic late Flamboyant and early Renaissance of Normandy and Flanders.

Considering the average intelligence of the brains through which Greek and Roman details have been sifted in order to evolve the designs of our public buildings in the West, we might conclude that the merits and demerits of these buildings, as works of architecture, were not worth serious discussion. So far as their value as actual monuments is concerned, this is so. But their size and prominence, combined with that attribute to which the public attach so much importance, their cost, and the fact that many will stand for ages in their respective localities without rivals in these qualifications for popular renown, have given them such a position in the public eye that, in spite of all that may be said, they will always stand as public educators of the most powerful sort.

The earliest were — like the old public buildings of the Eastern States erected after the last war with England — attempts to revive the temple architecture of Greece. The latest are dubbed Neo-Grec, and are in truth *copied out of French books* containing illustrations of the modern French work of the Second Empire, which followed the innovations of Labrouste. With both, and with all the intermediate styles, the dome has been introduced almost without exception. Ten years ago mansard roofs came to be considered as essential to all public as well as private buildings, but they have now fallen into disfavor. The State-House at Springfield, Illinois, representing an expenditure of three and a half millions, and still unfinished, has mansard roofs on the two wings only, for want of any other place to put them. For the main cornice is on one level, and the central building is covered by a dome; consequently the mansards are built up above the actual top of the building.

The most prominent public building now in course of erection in the Western States is the twin public building of the city of Chicago. It occupies an entire square in the centre of the city, and will have cost, when completed, in the neighborhood of four million dollars. It consists of two structures almost exactly the same in design, but differing slightly in the materials used. One half is for county purposes and the other is for the use of the city government. Each building has one long front and two short ones. But they are to be connected at the ends by large arches covering the approaches to interior courts, and in the centre by a rotunda common to both buildings. In this twin building, the arrangement of which for county and city purposes is novel, no mansard roofs have been introduced. But in one important respect it makes a departure from the vernacular public building, — it will have no dome. And the reason why it will have none is that public opinion, and nothing else, has condemned the idea. A dome, or rather domical tower, was designed to stand where the rotunda is now to be placed, and the work was actually commenced. But the agitation of the question of dome or no dome was so long continued, that it became the theme of popular conversation in the city. And when the people talked they naturally began to inquire as to the proprieties of the matter, without regard to precedents. Two arguments prevailed: One was that a dome would be of no practical use, and, inasmuch as it would be purely an ornamental appendage if erected, it was found that it would be more than useless, for the reason that it could not be seen to advantage from the streets of the city. The argument in favor of economy certainly had weight in preventing the erection of a great and costly dome, but it is doubtful whether it would have been vetoed had not a popular agitation resulted in making evident the absurdity of erecting a dome that was of no use, and could not be seen except from the suburbs. So here we have a case in which popular opinion has had a direct influence upon the design of the most prominent building in a large city. There can be no doubt but that the example will become a precedent, and it is safe to predict that this structure will mark an important departure in the use of domes on public buildings. The decision in this case was doubtless influenced by the present condition of the dome on the unfinished State-House at Springfield, Illinois, a building which the present generation will not be likely to see finished, and which another generation will have too much good taste to complete.

The new State-House at Des Moines, Iowa, has a dome of iron and copper, just completed, and of small dimensions, suggesting in a measure a decreased sense of the importance of domes generally. The State of Indiana has just commenced its new Capitol, which is designed to have a dome of stone and iron. It will be many years in course of erection, and may prove to be the last of the domical State capitols. All these buildings are in the American Renaissance style. They are all costly and elaborate.

Thus far no state or county building in the Western States has been erected in any other style. But there is a class of public buildings, of which a large number have been erected of late years, in which a greater originality of style and more perfect adaptability to their purpose has been displayed. These are what may be generically termed "public institutions," erected for various charitable purposes.

The great improvements lately made in the management of public institutions, such as hospitals and insane asylums, the introduction of machinery for performing much of the labor required in their care and maintenance, and improved systems of heating, ventilating, lighting, and cooking, have all contributed toward giving a utilitarian character to such establishments. And this has not failed to have a direct influence upon their architecture. The disposition of the buildings with reference to giving them the best positions for obtaining light and air, and their arrangement to meet the several conveniences of communication, have brought them into picturesque groupings. The necessity for having tall chimneys and ventilating shafts has led to the treatment of such necessary accessories in an artistic manner, giving them prominence rather than attempting to hide them. Clocks are desirable on such buildings, and hence clock-towers are introduced, while other towers are required for water-tanks.

For such requirements the old conventional forms of classic architecture are inappropriate: Hence architects have exercised more freedom in architectural treatment. But still another influence has been felt in the erection of such structures, which is found in the materials of construction employed. When it is proposed to erect a state-house or a city-hall, the design is first made, and the material is procured to carry out the design. In such cases it is not thought inappropriate to send to great distances for stones of a certain color or texture, while those which might be equally appropriate, and to which the designs could be readily adapted, are found in the vicinity. Thus the granite for the Cincinnati Custom-House is brought from Maine, and stone for the Chicago Custom-House is brought from the vicinity of Cincinnati. In the case of the erection of asylums and hospitals the appropriations are generally small at first, and the necessity for economy compels the adoption of a stone which is near at hand. The designs must be adapted to such stone, hence the buildings are likely to have a character in consonance with the qualities and possibilities of the stone employed. The history of architecture, through all time, shows that the best architectural forms have always been developed from a necessity to work in a given material. Still there is another reason why the public institutions of the West are more elastic in design than all others. It is found in the fact that so many are built of brick. The use of bricks has always given architects great freedom in design. The use of a material which is generally considered to have no beauty in itself has always led designers to seek beauty in the disposition of masses rather than details.

Taking all these circumstances together, we find good reason for the fact that a decided improvement has taken place of late years in the design of public buildings of this class. This result has come from natural and legitimate causes, and whether such

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works have been intrusted to architects of ability and education, or to the average of those who may be found in the Western States, they have been architecturally more satisfactory than the more pretentious court-houses and State Capitols. The style commonly called Gothic, but which has only a vague resemblance to historical examples of that style, has lately predominated in buildings of this class. The best of them are those in which ideas of style have been least prominent, and in all of them there is evidence of a tendency toward a national architecture. It is useless, in the limits of this paper, to name any number of these buildings. From the very nature of their objects they are of necessity isolated structures, often built in places where they are seen by few persons beside the residents of the neighboring city or village. Hence as standing examples of architectural art they can exert but a limited influence as public educators. — *P. B. Wight in the American Art Review.*

ANCIENT AMERICAN POTTERY.

MR. F. W. PUTNAM made a communication at a late meeting of the Boston Natural History Society, on the principles involved in the ornamentation of the pottery of some of the ancient nations of America, with particular reference to that from the Cumberland Valley in Tennessee, and from Nicaragua; illustrating his subject by a fine series of vessels of various shapes, selected from the Peabody Museum of American Archæology and Ethnology.

After a general review of the methods of ornamentation employed by American nations of the past, he showed that, by a study of such large collections as those in the Peabody Museum, the artistic development of the ancient peoples of America was far greater than generally stated by writers; and that the art of ornamentation had, in many instances, risen above the simple patterns made by incised lines, rude stamps, and other early and crude forms. Both in color and in plastic work, a realistic art had been produced which had often resulted in conventionalisms of great interest.

He also stated that a study of this ancient pottery, with these principles of conventionalism borne in mind, would not only place some of these ancient American nations in a much higher artistic period than formerly supposed, but would also lead to the understanding of many of the singular ornaments on the ancient vessels, many of which, without this knowledge of the existence of realistic and conventional art, would be looked upon as crude and meaningless attempts at ornament, whereas, as he showed by several series of specimens, the simple knobs arranged symmetrically about a pot or water-bottle, were instances of pure conventionalism from realistic forms, and prove that a comparatively high attainment in the decorative art had been reached.

A proper and careful study of the principles involved by this interpretation of the artistic development of the ceramic art in America, he thought, would in time furnish means of making comparisons in regard to the probable connection of one ancient American nation with another, and also an understanding of many of the singular resemblances between widely separated peoples. Still, he said, the whole subject was yet in its infancy, and the connection of one ancient people with another in America can at present only be suggested from very unsatisfactory data.

OLD FURNITURE IN WASHINGTON.

THE amount of second-hand furniture bought and sold in Washington is extraordinary. It is greatly owing to the floating population that the auctions have come to be a permanent feature of the streets of the national capital. The mania for the antique draws into the second-hand stores the boundless household resources of all this old Maryland and Virginia country. New England has been swept and dusted for the last ten years, until I should fancy there are no *new* antiques left, but in Washington the demand is more recent and the supply larger. Old homesteads have been broken up by the fortune of war and subsequent misfortune, and the flotsam and jetsam floats up to the wreckers. The second-hand stores are full of sideboards and mirrors and stately chairs that have seen better days. One day some months ago I stopped to look in Thompson's window on the avenue at a brass fender, a perfect Grand Patriarch of a fender. And then I caught sight of a carved bed-post, in the old English carving of a hundred years ago, solid mahogany, good as gold and warm as wine. And then, having got the *entrée* to this old curiosity shop, I was taken through all the débris, away back to the room where the "renovating" is done, and dull and dingy furniture "suffers a sea-change" into something as much better than new as is old wine than new. It has the warm rich tone that is without money and without price, and which only age can bring. Mr. Thompson has fitted up a number of rooms in old mahogany for Washington people of wealth and taste.

At the great sale at the Gales mansion a while ago, bric-à-brac of all sorts was set adrift. Most of it was bought on the spot by private individuals, though some fell into the hands of the dealers. I saw in a store afterward a quaint old mirror which came from there. It was about thirty by twenty inches, and made with leaves hinged on and folding over in Japanese fashion, and mounted with strong brass rings for hanging — a mirror made to travel round the world without breaking — and it brought only $2.50! Down on the Eastern Shore, a friend who lives there tells me, there go for a song at country sales andirons that for beauty of workmanship would command a high price in decorative-art rooms. I remember an artist who once told me of andirons he had seen in the interior provinces of France that were poems in iron. My friend declares that at a breaking-up sale near Norfolk, the other day, she bought a pair of sohnets in brass. — *Calista Halsey, in the Art Amateur.*

ROMAN ARCHÆOLOGY.

ROME will soon have a new theatre on the street just completed, between the old and the new quarters of the city. It has been built by Signor Costanzi, at a cost of two hundred and fifty thousand dollars. This is an extraordinary undertaking for one person, as generally there is little enterprise here, and the Government is expected to do everything of the kind. In digging the foundations of this theatre, which is situated on the Esquiline, and not far from the Baths of Diocletian, a beautiful statue was found, which Signor Costanzi exhibits and would sell. An ancient mural painting was also found here which he proposed giving to the city. It represented a sacrifice to Jove, and was unique of its kind; but, unfortunately, in moving it it was broken into fragments which could not be united. In the excavations now making for the sewers and for the gas and water pipes at the Piazza de Termini, a Doric column of *giallo antico* was found. The capital was discovered at a short distance. Two hundred men are employed here to prepare three gardens or public squares, which will convert the now desert region near the Baths of Diocletian into a pleasant resort. At the Baths of Caracalla the excavations have laid bare the floor of the large gymnasium. A vineyard which occupies the site of the ruins on this side will be purchased by the Government, in order to continue the excavations. The whole of this marvellous edifice cannot be displayed until this is done. At the Palatine the Imperial Stadium is gradually undergoing restoration to its original form, and the Roman Forum is in process of excavation near the ancient Temple of Romulus, now the Church of Saints Cosmo and Damiano.

Also at Ostia new discoveries have been made. Beside the Imperial Palace, the Temple of Vulcan, and other buildings, there are now to be seen the remains of the ancient grain magazines at that port. During the last inundation of the Tiber some of the excavations already made on the border of the stream were filled with mud, which it is necessary to remove, besides building a wall to protect these points in future. It has been found that the Tiber is gradually encroaching on the ruins of Ostia, and, by a calculation recently made, it has advanced one hundred and fifty feet since the year 1812. It will be necessary to raise an embankment to protect them, the cost of which will be not less than ten thousand dollars.

It is the fashion now among certain correspondents for English papers to accuse the Italian Government of great negligence of the ancient objects of art found beneath its soil, and of the churches and monuments. But the fact is that the archæologists of Italy display a febrile activity for the preservation of these treasures, and the Government devotes annually a not indifferent sum of money to this purpose. Not only are the monuments of Rome carefully guarded, but, as far as the money will go, those of other parts of Italy. Thus, for instance, it has long been known that the remains of a celebrated temple of Apollo exist at Terracina, upon which had been erected another building. The Committee for Monuments has recently ordered the removal of the construction, in order that the majesty of the primitive edifice may be brought to view. At Tolfa, near Civita Vecchia, a great quantity of objects — the remains of an ancient Etruscan city — have been found, and the committee has taken measures to preserve them, so they may not be carried to other countries. At Frascati, in the Church of the Vivario, are some valuable frescoes of the fifteenth century, which are hidden behind a wall in the choir, built a century later. These frescoes will be taken care of so that they may serve as studies for painters. An ancient Pelasgian citadel at Alatri, which has been neglected, will be restored. The disputes among the archæologists, who are as jealous of each other as doctors, often become warm. One calls Fiorelli, the superintendent, the "archæological pope," and blames him for neglecting the frescoes found in the ancient Roman house on the bank of the Tiber. Forthwith the Minister of Public Instruction calls the whole Academy of St. Luke to decide whether they shall remain as they are on the old walls, or be transferred to canvas. The decision of the Academy was that the frescoes are suffering injury in their present condition, and something will immediately be done to preserve them. Photographs have already been taken by Signor Tuminello. — *New York Evening Post.*

UNDERCUTTING ARCHITECTS.

DES MOINES, IOWA, March 1, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — Your remark in a recent issue in regard to a competition for the plans of a court-house in Palo Alto County will apply with equal and more force to a recent competition in this city. The supervisors of Palo Alto County were ignorant of the customary and regular fees for the service they required, and, on being properly posted, manifested their good sense by paying five per cent on the cost of the work. But in this city, where are located five prac-

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tising architects, a building committee, consisting of a bishop, a clergyman, an editor, a contractor, and three lawyers, invited all the architects to compete for the plans of a church to cost about $40,000, with no stipulations as to fees, presumably expecting to pay full regular fees of five per cent.

After wrangling for several weeks without definite results, the architects were again requested to compete for the price of their services. The work was awarded to the lowest bidders, who offer the full service of plans and superintendence for the sum of $350, less than one per cent of the estimated cost. Whether this building committee, consisting of leading citizens, all of them standing at the head of their respective professions, or the gentlemen who are pleased to call themselves architects, to whom the plans were awarded, are most to blame for this pitiful and degrading remuneration, I leave for your readers to judge.

Your excellent journal has done valuable missionary work for Western architects who are conscientiously striving to maintain the standing and dignity of the profession, and I will take this occasion to say that by some of us it is highly appreciated.

Yours, etc., B.

NOTES AND CLIPPINGS.

The Baltimore Society of Decorative Art. — An afternoon and an evening course of art instruction is now open under care of the Baltimore Decorative Art Society in the rooms of the Maryland Historical Society's Building, comprising classes in Charcoal Drawing, Water Colors, China Painting, Theory of Design, etc., for both ladies and gentlemen. It is proposed to have an informal weekly sketch class Friday evenings, opened to all members of the society and to all pupils. It is also proposed to have a monthly social meeting for all members of the society and all pupils, when a short instructive lecture or reading will be given on some art subject. A second course, similar to the first, will extend from April 1 to July 1.

The Temperature of Sewage. — Apropos of the cold, a writer in the *Revue d'Hygiène* has drawn attention to a curious fact which cannot fail to interest all those who have followed the question of the utility, from an agricultural point of view, of the sewage of the great capital [Paris]. During the recent cold, when the thermometer marked in the streets nearly zero (Fahrenheit), the temperature in the drains remained always above freezing-point, notwithstanding which, the authorities stopped the machines which pump a certain quantity of the sewage on to the plain of Gennevilliers. The market-gardeners of this important suburb asked the engineers to continue the sewage irrigations, to clear away the mass of snow which covered their fields, as also to save their vegetables frozen up with the soil. The irrigations were, therefore, continued at Gennevilliers during the most severe cold, and the vegetables from this surburb contributed to a large extent to provision Paris when from the other usual sources the market-gardeners were unable to send in any vegetables. Thermometric observations showed that the sewage, after having been filtered through the soil, still retained a temperature of +10° and +12° Centigrade (that is, more than 50° Fahrenheit) when it issued from the drain and ran into the Seine. This is a fact worthy of attention at a moment when the value of sewage as a means of irrigation is under discussion. It may be added also that between Clichy and Argenteuil, the Seine, which receives between those two points the greater part of the outlets of the Paris drains, was not frozen when the ice between the bridges was more than a foot thick. The recent statistics which have shown how at Croydon and elsewhere the death-rate has sensibly diminished, since the use of sewage for irrigation, have attracted not a little notice on this side of the Channel, where the discussion rages with as much warmth as on the other side. If as one result of the late frost we on the banks of the Seine have had to content ourselves without vegetables and fruit, we have not had to suffer like our Venetian friends, who, we hear, have been entirely deprived of their at-all-times insufficient supply of water. — *Paris Correspondence of the Builder.*

The Way of the Striker. — An almost amusing illustration of the peculiar ways of strikers comes from the mines of the Houtzdale, Penn., region. The coal miners demand an advance of 10 cents per ton; and this might be granted if the operators could have assurance that it would finally settle matters. But there have been nine strikes in three months. First they struck for a check weighman, upon the plea that the operators were cheating them. This was granted with the proviso that the weighman should be paid by the men themselves. Then they struck to have the said weighman placed upon the company's pay roll, and carried that point. Then the drivers struck for an advance of 25 cents per day, and got it. Then the trappers struck for an advance of 10 cents per day, and got it. Then the miners struck for 10 cents per ton advance for mining, and got it. Then the drivers struck for an advance of 25 cents per day, and for "ten hours," and got both their claims allowed. Then the miners organized the present strike, and the drivers propose to follow suit. In view of these constant and repeated demands, the operators have come to the conclusion that it is necessary to draw the line somewhere. In fact, if the thing is to go on, the mines themselves might as well be deeded as a free gift to the workmen. For it is impossible to carry on any business successfully or even intelligently if wages are thus to be kept uncertain, and always on the rise at that. — *New York Tribune.*

A Case for the Anti-Restorationists. — When Washington was on his way to Red Bank one hundred years ago, he slept one night in Chew's Landing, a New Jersey village. Next morning he was surprised to find that half the inhabitants had formed themselves into a delegation to ask of him a contribution toward a new Episcopal church. He not only gave the contribution, but signed the church book, and so did Carroll of Carrollton. The book has been religiously preserved in the vestry, and every Governor of New Jersey has for many years given something to keep the building in order. Now, however, it is to be torn down and a commonplace brick church built in its stead.

Women Artists as Academicians. — It has been rumored for some time that the Royal Academy has determined to throw open the distinction of its membership to women as well as men, and it is now said that the determination only wants the Queen's assent to be carried into effect. Her Majesty is scarcely likely to affront her own sex by refusing her ratification to a very sensible resolution. The precedent of Angelica Kaufmann occurs at once and naturally to the mind which after the English manner seeks for and is comforted by precedent. But in truth no such corroboration is required. There can be nothing in the nature or functions of a Royal Academy of Arts to exclude lady candidates who have proved their competence in an art for which their sex has long ago proved its aptitude. It would be invidious to suggest the names of any such candidates at the present moment, but no frequenter of galleries will have any difficulty in recalling several. We shall hope that the extension of the privilege will not be accompanied by any of the somewhat absurd and unreasonable restrictions which sometimes attend concessions of this kind. Some rumors, for instance, have been set abroad about an intended exclusion of lady associates and academicians from the annual dinner, which seems to some people the most important of the academic functions. Considering that bishops frequently assist at this solemnity, there surely can be no reason why ladies should not be present likewise. If their presence restrained the guests from depositing cigar ashes in convenient horse-hoofs as a tribute to the excellence of the statuary, it would perhaps be no very great loss. Burlington House is quite large enough to enable a smoking room to be set apart. — *London News, January* 31.

The Louisiana State-House. — The joint committee appointed by the General Assembly of Louisiana to examine the old Capitol at Baton Rouge and make an estimate of the cost of repairing and refitting it for State purposes, report that it would probably cost $197,000 to place the building in a proper condition. The old walls must be torn down to the first floor, and two additional stories of brick and stone built. It will also require new heating apparatus, complete drainage pipes, vaults for the Treasurer and the State records, painting, etc. An additional expense, which is not included in the above estimate, must be made in the purchase of furniture, carpets, the fitting up of the different departments, etc.

New Public Baths in Paris. — The Paris Municipal Council has under consideration a plan to construct four large swimming baths in different parts of the city, where for 25 centimes one will be able to bathe all the year round in a current of clear water kept at a suitable temperature and protected from the weather. Four sites are to be chosen in the most popular districts, the Quay de Billy, La Villette, the Pont d'Austerlitz and Ménilmontant. The construction will be solid, and the basins will be 75 metres long by 15 metres wide. In order to secure a proper temperature for the water, the city will cede to the contractors the condensed steam from its engines, but in return it will require 600,000 tickets of admission at one penny, and certain hours to be fixed at which the pupils of the communal schools shall be admitted free.

Herr Gustave Klotz. — The death of the architect of the Cathedral at Strasburg, Herr Gustave Klotz, is recorded.

Gold in Russian Architecture. — The report of Russia's wish to negotiate a new loan, and the undoubted fact of her paper ruble being now worth only fifty cents instead of seventy-five, suggest some curious ideas in connection with the magnificent church now being completed in Moscow, with a thick plating of gold on its dome and cross. This fashion of gilding church towers is universal in Russia, and it has been calculated that enough gold is thus lying idle to pay off the national debt. The Isaac Cathedral in St. Petersburg has a plating of gold three quarters of an inch thick over the whole of a dome as large as that of St. Paul's in London. The Church of Our Lady of Kazan has a massive altar furniture of solid silver. During the great fire of Moscow, in 1812, the molten gold and silver were seen flowing like water from the churches, and the new addition to them which is about to be consecrated represents an outlay of fully $15,000,000. — *Illustrated News.*

The Campanile at Florence. — In a new edition of Vasari's Lives of the Artists it will be shown by unpublished documents that Giotto erected only the first stage of the Campanile at Florence; and that, after he died, the work was carried on by Francisco Talenti, and not by Taddeo Gaddi, as has been supposed.

Who will Reform the Reformers. — The *Sanitary Engineer* says that the Vergennes, Vt., Reform School is so crowded, that one hundred and twenty-two boys sleep in a room 46 by 40 feet, and that although the beds have but the narrowest spaces between them, some of the beds have to be double-deckers, so to speak, to accommodate this number.

"Kansas Natural Lime." — A Kansas gentleman who noticed in a Western paper an article on "Kansas Lime" copied from the *American Architect* writes: "I thought that the description was of gypsum; it resembles it very closely. Gypsum is abundant here, there being a stratum of it of from three to seven feet thick overlaying about one third of the centre surface of this county. There seem to be three kinds of it, one kind that can be dug with a spade, and the other two are harder. I have an egg cup that was turned out of gypsum by a hand lathe four years ago. I have boiled vinegar in it, and melted glue in it, and thrown it in many ways, trying to break it, but cannot. In appearance it resembles red, streaked marble. Gypsum is much used here for building, as a mortar; is set very quickly, somewhat like 'water lime.' There is a brick made of it here that is destined to find its way into your market, being at once a cheap and attractive building material."

The Peabody Buildings, London. — It is charged that the Peabody Buildings in London are let at such high rates and so managed that instead of being occupied by the working classes they are taken up by people who can well afford to pay a higher rent, and those for whom they were designed get no benefit whatever from them.

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BUILDING INTELLIGENCE.

[Reported for the American Architect and Building News.]

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

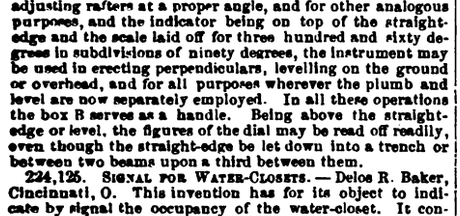
BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

223,343. PLUMB-LEVEL. — Mordecai Harrison, Columbia, S. C. This invention relates to plumb levels wherein a needle is made to traverse a protractor and indicate the angle which the level makes with the horizontal or vertical planes. A designates a straight-edge and B a metallic box, having a plane front and back, and secured to the straight-edge by the flanges *a* and *b*. The upper end of this box is provided with a ring, *c*, by means of which it is conveniently handled. C is a horizontal pivot, having its bearings in the front and back of the box, and is provided, inside of the box, with a projecting arm, *d*, having at its end a weight, *w*, and it turns readily in its bearings, so that the weighted arm will always depend vertically therefrom, whatever be the inclination of the straight-edge.

The ends of C project beyond the box, and are each provided with an index, D, which traverses a graduated scale, S, engraved on the face-plates of the box. The scales are laid off from 0° to 90°, completing the circle in four subdivisions, the subdivisions being again subdivided into graduations of 45° and fractional parts thereof, usually five degrees. In very fine work the scale may be laid off in degrees. The flanges, *e*, serve to prevent the indexes from being jammed, and protect them from being bent or displaced. The entire box and its attachments, except the straight-edge, which is preferably of wood, are made of metal, and the box is weather and dust proof. This device is of great utility in adjusting rafters at a proper angle, and for other analogous purposes, and the indicator being on top of the straight-edge and the scale laid off for three hundred and sixty degrees in subdivisions of ninety degrees, the instrument may be used in erecting perpendiculars, levelling on the ground or overhead, and for all purposes wherever the plumb and level are now separately employed. In all these operations the box B serves as a handle. Being above the straight-edge or level, the figures of the dial may be read off readily, even though the straight-edge be let down into a trench or between two beams upon a third between them.

224,125. SIGNAL FOR WATER-CLOSETS. — Delos R. Baker, Cincinnati, O. This invention has for its object to indicate by signal the occupancy of the water-closet. It consists in the arrangement of a shifting signal, in connection



with a movable floor in the closet, so that the weight of the occupant of the closet will operate to display the signal. A represents the water-closet of a railway-car, having the usual commode-seat. The floor is hinged at *b*, and its free end rests upon spring-buffers, C, and is provided with an arm, *b'*, to engage with a horizontal lever, D, pivoted at *d* to a lug upon the car-sill. The extreme end of the lever D is secured to a rod, E, which moves in guides, and carries a signal-board F. The rod E and signal-board F are inside the water-closet, close to the partition or wall G, and are concealed by boxing, H. The side of the signal-board which faces the opening *g*, in the partition, is painted in two colors. When a person enters the closet his weight compresses the floor, and motion is communicated through *b'*, lever D, and rod E, to signal-board F, which falls so as to display the contrasting color through opening *g*. When the occupant leaves the closet the floor rises by virtue of the spring-buffers C, and the signal-board rises so as to display the color harmonizing with the outside finish.

225,004. HANDLE FOR FILES. — Crawford M. Fairbanks, Central Falls, Pawtucket, R. I.

225,021. WINDOW-NETTING. — Charles T. Phelan, New York, N. Y.

225,033. WEATHER-STRIP. — James T. Westbrook, Basco, Ill.

225,055. COMBINED HOUSE SPEAKING AND SIGNALLING APPARATUS. — Charles Heisler, St. Louis, Mo.

225,060. COMBINED CAPITAL AND BASE FOR METALLIC COLUMNS. — Job Johnson, Brooklyn, N. Y.

225,061. TUBULAR PILE. — Job Johnson, Brooklyn, N. Y.

225,065. BUILDING HOUSES, BARNS, FENCES, ETC. — Josiah M. Leeds, Kokomo, Ind.

225,083. HOT-AIR REGISTER. — Edward A. Tuttle, New York, N. Y.

225,084. HOT-AIR REGISTER. — Edward A. Tuttle, New York, N. Y.

225,085. HOT-AIR REGISTER. — Silas Tuttle, Jr, Brooklyn, N. Y.

225,094. ROOFING COMPOSITION. — Geo. W. Bender, Canton, O.

225,107. MOULD FOR BRICK MACHINE. — George Carnell, Philadelphia, Penn.

225,116. SHUTTER-WORKER. — Russell G. Dudley, Jersey City, N. J.

225,117. WINDOW-POLISH. — John M. Farrier, Dayton, Ohio.

225,119. GLUE-CEMENT. — John Frimbach, Brooklyn, N. Y.

225,135. WRENCH. — Harrison P. Hood, Indianapolis, Ind.

225,180. SASH-SUPPORTER. — Wm. W. Sweetland, Edwardsburg, Mich.

225,192. APPARATUS FOR COOLING AIR. — Walter S. Wilkinson, Baltimore, Md.

225,193. CISTERN-PUMP. — Martin Weiser, Armstrong, Kan.

9,181. KNOB ATTACHMENT. — (*Reissue.*) William H. Gonue, Chatham, Ontario, Can.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since our last report: —

John Heusler, 2 three-st'y brick buildings, N. Gay St., between Bond and Broadway, 18′ x 58′.

Mary Mumma, three-st'y brick building, 162 Greenmount Ave.

Elizabeth Burnap, two-st'y mansard roof dwell., cor. Calvert and Chase Sts., 22′ x 79′.

G. Muller, two-st'y brick building, 103 Wolf St., between Gough and Bank Sts.

J. Q. Codling, 3 three-st'y brick buildings, on Fort Ave., between Howard and Charles Sts.

J. Q. Codling, 3 three-st'y brick buildings, Randall St., between Hanover and Charles Sts.

Dr. Sappington, addition and improvement to store, No. 168 Lexington St.

Mrs. Wiesenfeld, four-st'y warehouse, No. 31 Howard St., between German and Lombard Sts.

James Rieman, two-st'y brick building, Paca St., between Baltimore and German Sts.

Hannis Distilling Co., one-st'y brick warehouse, cor. Ostend and Russell Sts., 58′ x 120′.

Geo. Blake, 4 three-st'y brick buildings, cor. Charles and John Sts.

Sixty-seven permits were issued during February by the Appeal Tax Court.

HOUSE. — Messrs. Wyatt & Sperry, architects, are preparing drawings for a suburban cottage for Chester Turnbull, Esq.; cost, $4,000.

MARKET-HOUSES. — Mr. Beetley, Inspector of Buildings, recommends improvements to market-houses, as follows: Broadway, $2,500; Belair, $2,000; Lexington, $5,500; Hollins, $200; Richmond, $900; Hanover, $1,000; Centre, $600; Lafayette, $30.

POST-OFFICE. — The bill appropriating $550,000 for the purchase of a site for the new post-office in this city having become a law, the work of tearing down the old buildings will soon commence.

ASYLUM. — The legislative committee recommend an appropriation of $50,000 for additional buildings, and $10,000 for sewer drainage and improved water supply for the Spring Grove Insane Asylum.

CHURCH. — Work is progressing on the Harlem Park M. E. Church. It is intended, during the coming summer, to extend the building so as to cover the entire lot of 61 feet by 157 feet. Baltimore County blue-stone, with Ohio-stone finish, and granite sills and steps, are used. The style is Gothic, with open-timber roof of entirely new design, and of a very ornamental character; cost, about $12,000. Messrs. Dixon & Carson, architects; Wm. Ferguson, builder.

Boston.

BUILDING PERMITS. — Since our last report the building permits granted are as follows: —

Brick. — 327 *Commonwealth Ave.*, 1 dwell., 25′ x 71′; three stories; J. W. Tobey, owner and builder.

47 *Pleasant St.*, for Estate of M. Cutler, 1 tenement-house, 34′ x 50′; four stories; W. M. Rumery, builder; A. Frink, architect.

806 *Washington St.*, for U. Crocker, 1 store, 18′ x 70′; T. J. Whidden, builder.

Howard St., Ward 20, for Globe Nail Co., 1 gas house, 30′ x 54′.

Wood. — *Centre St.*, Ward 23, for R. Marsh, 1 dwell., 33′ x 27′.

Washington St, cor. Melville Ave., for E. Torrep, 1 dwell., 47′ x 49′; S. H. L. Pierce, builder; Cabot & Chandler, architects.

Jamaica St., Ward 23, for M. Flynn, 1 dwell., 28′ x 30′; M. D. Ayers, builder.

Wilmont St. and Walnut Ave., for Chas. A. Dean, 3 dwells., 24′ x 35′; A. Frink, architect.

622 *Warren Ave.*, for A. Dunyor, 1 dwell., 25′ x 37′; G. M. Harding, architect.

Mount Bowdoin Ave., for H. Stevens, 1 dwell, 35′ x 55′; E. E. Chapin, builder.

Hancock St., for A. N. Shepard, 1 dwell., 28′ x 30′; W. H. Gordon, builder.

Centre St., for A. French, 1 stable, 38′ x 38′; J. D. Wester, builder.

Everett St., Ward 23, for R. F. Hyde, 1 dwell., 31′ x 25′; J. D. Wester, builder.

HOUSES. — On St. James Avenue, nearly adjoinining the Art Museum, is to be built this spring a block of six houses for Mr. Henry B. Williams. The only stone-work will be the sills. Each house has a different arrangement, the depth varying from 63 to 83 feet, while the width of each (24 feet) is the same. Mr. Ralph W. Emerson is the architect.

Brooklyn.

BUILDING PERMITS. — *Fifteenth St.*, 1 two-st'y frame dwell., 20′ x 36′; cost, $1,100; owner, M. Brenen, on premises; builders, Cliff & Co.

Sumpter St., 1 two-st'y frame dwell., 25′ x 40′; cost, $1,600; owner, Matthew Barke, Chauncey St., near Ralph Ave.; builders, M. Costilon and Chas. Burton.

Portland Ave., 1 four-st'y brown-stone dwell., 20′ x 50′; cost, $18,000; owner, G. W. Brown, 46 South Portland Ave.; architect, C. B. Sheldon; builder, Levy Brown.

Marcy Ave., cor. Ellery St., 1 three-st'y frame tenement, 27′ 6″ x 55′; owner, F. Miller, Lewis Ave., cor. Hart St.; architect, Geo. Lehrian, Jr.; builders, Geo. Lehrian and J. Rueger.

Flushing Ave., 1 three-st'y frame store and tenement, 25′ x 50′; cost, $3,500; owner, Richmond Williams, 232 Ellery St.; architect, B. Krammie; builders, M. Mott and P. Creamer.

Ellery St., 1 two-st'y frame tenement, 30′ x 36′; owner, F. Miller, Lewis Ave., cor Hart St.; architect, Geo. Lehrian, Jr.; builders, Geo. Lehrian and J. Rueger.

South Second St., 1 four-st'y brick factory, 100′ x 44′; owner, E. Ketcham & Co., New York; architect, John J. Clyde; builder, Stephen J. Barrows.

Willoughby Ave., 1 two-st'y brown-stone dwell., 20′ x 40′; owner, John D. Lipe; builder, James Lock.

Atlantic Ave., 1 two-st'y brick stable, 50′ x 85′; cost, $7,000; owner, Atlantic Avenue Railroad Co., Third Ave. and Atlantic Ave.; architects, W. H. Hazzard & Son; builder, John D. Anderson.

Scabring St., cor. Richards St., 1 three-st'y brick factory, 50′ x 50′; owner, R. A. Cheesborough, Delevan, cor. Richards St.; builder, P. Carlin.

Buffalo.

STORES. — Gibson T. Williams, Exchange Street; cost $10,000; M. E. Beebe, architect.

Three-story brick store, Niagara Street; Henry Zink; F. W. Caulkins, architect.

HOTEL. — Bronson C. Rumsey and others, brick hotel, Exchange Street; cost, $20,000; M. E. Beebe, architect.

REPAIRING. — Messrs. Bronner & Co., clothing house, enlargement; cost, $3,000; Holmes & Little, architects.

OFFICE BUILDING. — Delany Forge & Iron Company, office, 17 by 56 feet; F. W. Caulkins, architect.

HOUSE. — Frame house, C. H. Lyman; cost, $5,000; F. W. Caulkins, architect.

Chicago.

BUILDING PERMITS. — *Dearborn* and Sixteenth Sts., repairs of Imperial Mills, for Douglas & Stewart; cost, $39,000.

Noble St., near Milwaukee Ave., two-st'y store and dwell., for J. Wojtalvecz; cost, $2 900.

Dashiel St., No. 31, two-st'y dwell., for Wahrmann Brothers; cost, $2,000.

Lake St., No. 166, four-st'y warehouse for C Busby; cost, $3,000.

Rumsey St., No. 135, two-st'y dwell, for Aug. Schach; cost, $2,500.

Wessen St., No. 82, two-st'y dwell., for O. A Lumberg; cost, $4,000.

Ewing and Clinton Sts., two-st'y dwell., for F. Duorah; cost, $3,500.

Canal St., near Carroll, machine shop, for C. A. McDonald; cost, $6,000.

Ogden Ave., No. 291, two-st'y store and dwell., for A. B. Bristol; cost, $4,000.

State and Illinois Sts., 3 three-st'y dwells., for Catherine Price; cost, $15,000; and a three-st'y dwell., for the same, at 199 Ontario St.; cost, $5,000.

McGregor St. No. 133, two-st'y dwell., for Peter Birelbach; cost, $3,000.

Wabash Ave., Nos. 267 *and* 269, repairs of burned building, for Dr. W. H. Ryder; cost, $6,000.

Dearborn Ave., cor. Oak, three-st'y stone-front dwell., for Misses McDonald; cost, $14,000.

Twenty-ninth and Butler Sts., building for John Ernst; cost, $2,800.

North Clark St., Nos. 487 *and* 489, 2 three-st'y dwells., for Eldridge Haney; cost, $15,000.

Chicago Ave. and Armour St., two-st'y dwell., for Geo. Eiterman; cost, $3,500.

Frank St., No 77, two-st'y store and dwell., for Peter Labbe; cost, $3,500.

Ashland Ave. and Thirty-second St., a stock-house, cost, $3,000; blast furnace, cost, $80,000; a casting house, cost, $25,000; a two-st'y engine-house, cost, $5,000; all for the Union Rolling-Mill Company.

West Madison St., No. 276, three-st'y building, for John Spry; cost, $13,000.

West Ohio St., Nos. 224 *and* 226, four-st'y factory, for Banerle & Stark; cost, $10,000.

River St., Nos 42 *and* 44, addition to the warehouse of Norton Bros.; cost, $2,500.

DEPOT. — Mr. F. Slataper, Chief Engineer of the Pennsylvania Company, has completed the plans for the new Union Depot, between Canal Street and the river, and Madison and Van Buren Streets, and contracts will be awarded immediately and work commenced as soon as the weather will permit. It will measure 135 by 1,360 feet.

Cincinnati.

BUILDING PERMITS. — The following permits for buildings were issued during the month of February: —

Matthers & Dugar, two-st'y brick; cost, $2,000.
I. C. Cross, three-st'y brick; cost, $2,800.
H. Berens, 4 one-st'y frames.
H. Dieckmann, three-st'y brick; cost, $5,200.
A. Oesterman, three-st'y brick; cost, $4,200.
J. L. Driver, 8 three-st'y stone fronts; cost, $32,000.
C. D. Palmer, two-st'y brick; cost, $4,000.
H. Mueller, three-st'y brick; cost, $5,000.
W. Shaw, two-st'y brick; cost, $2,000.
J. Washar & Son, two-st'y brick; cost, $2,500.
J. D. Jones, four-st'y brick; cost, $5,000.
H. Schwegerman, three-st'y brick; cost, $4,000.
J. P. Schar, two-st'y brick; cost, $2,500.
H. Sumhorst, four-st'y brick; cost, $4,800.
E. Wittebrock, four-st'y brick; cost, $4,700.
M. Poff, three-st'y brick; cost, $4,000.
Evan & Berry, one-st'y frame; cost, $800.
G. Thawa, four-st'y brick; cost, $5,400.
J. Mayer, two-st'y brick; cost $3,000.
H. Borgedus, two-st'y brick; cost. $1,500.
Eighteen permits for repairs, $5,200.
Total permits for the month, 41.
Total cost for the month, $106,800.
Total permits to date, 86.
Total cost to date, $190,475.

Cleveland.

HOTEL. — Mr. S. Lane, architect, is preparing plans for a large six story hotel, which may be built by Mr. L. E. Holden, at an outlay of $100,000.

New York.

BUILDING PERMITS. — *Sixty-ninth St.*, two first-class houses, 20′ 6″ x 61′ 6″, four stories and basement, brown-stone fronts; Lamb & Wheeler, architects; A. Mowbray, owner and builder; cost, $40,000.

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Fifty-seventh St., W., No. 34, four-st'y brown-stone house, 25′ x 83′, for Mrs. Amelia W. Chapman; Messrs. Jas. C. Hoe & Co, builders; cost, $45,000.

Second Ave., No. 692, a five-st'y brick tenement and store, 25′ x 67′ 4″, for Jacob Schlveser; W. J. Hoffman, architect; cost, $11,500.

Alterations. — *Tenth St., No.* 19, *W*, four-st'y brick dwell., internal alterations; cost, $5,500; owner, Wm. Man, 56 Wall St.; architect, John B. Snook; masons, Robinson & Wallace; carpenter, John Byrne.

Corlaers St, rear, one-st'y brick car stables, 70′ x 114′, to have a second story added; cost, $13,000; owners, Dry Dock, E. B. & B. R. R. Co.; architect, John Corrigan; mason, R. R. Darragh; carpenter, Edward Gridley.

Maiden Lane, No. 115, four-st'y and attic brick store, damage by fire to be repaired; cost, $2,000; agent, C. G. Stedman, 79 Cedar St; builder, Wm. S. Barton.

Eighth Ave., cor. One Hundred and Twenty-fifth St., 2 two-st'y stores and dwells., corner building to be raised to three stories, internal alterations; cost, corner house $1,800; house on avenue, $1,000; owner, Alvah H. Walker, 43 West One Hundred and Thirtieth St.; architect, Theo. E. Thomson.

Broadway, No. 74, four-st'y brick office building, an additional story to be built, and internal alterations; cost, $12,000; owner, Peter Marie, 48 West Nineteenth St.; architect, D. Lienau; mason, John Banta; carpenter, L. W. Williams.

Front St., No. 96, five-st'y brick warehouse, internal alterations; cost, $4,000; owners, Estate of John Caswell; architect, Charles C. Haight; mason, J. M. Dodd, Jr.; carpenter, L. Williams.

Eighty-first St., No. 80, *E.*, four-st'y brick dwell, damage by fire to be repaired; cost, $3,920; owner, E. P. Shaw, on the premises; builder, Henry Wallace.

Fifth St., No. 214, three-st'y brick store and dwell., three-st'y brick extension, 25′ x 38′, to be built, internal alteration; cost, $4,500; owner, L. Berndt; architect, Wm. José.

Elizabeth St., Nos. 85, 87, *and* 89, five-story brick factory, a one-story brick extension, 50′ x 27′, on rear; cost, $1,500; owner and builder, Wm. A. Colt; architects, Thom & Wilson.

Twenty-fifth St., Nos. 413 *and* 415, *E*, four-st'y brick factory, to be raised to five stories; cost, $2,000; owner, Charles Wagner, 327 East Sixty-fifth St.

Pearl St., No 436, five-st'y brick factory, repair damage by fire; cost, $5,000; owner, Estate of Ellen A. Johnson; builder, W. C. Hanna.

Great Jones St., No. 17, four st'y brick dwell., four-st'y extension on rear; also, interior alterations; cost, $8,000; owner, John T Lord, London; architect, Theo. G. Smith; builder, Thomas Cockerill.

Kingsbridge Road, cor. Bathgate Lane, one-st'y brick church, interior alterations; cost, $3,500: owner, Fordham Reformed Church; architect, James Stroud; builder, C. V. Folin.

Washington St., Nos. 78, 80, *and* 82, seven and eight st'y brick soap factory, No. 80 to be raised to eight stories; cost, $2,000; owner, B. T. Babbitt, on premises.

First Ave., No. 75, four-st'y brick factory, four-st'y extension on rear; cost, $2,500: owner, Edward Burger, on premises; architect, F. W. Klemt.

Broadway, Nos. 156 *and* 158, will have an extra story, an elevator put in, and other improvements made, at a cost of about $10,000. Mr. S. D. Hatch is the architect.

Tenth St., W., No. 192, is to be altered into an apartment-house from the designs of Messrs. G. F. Babb and Walter Cook.

Broadway, Nos. 922 *and* 924, is to be altered and an extension added, at a cost of about $10,000. Messrs. Morton & Chesley, carpenters; Messrs. Robinson & Wallace, masons.

Madison Ave., cor. Thirtieth St. Residence to be changed into apartment-house; Mr. Arthur Gliman, architect.

West Tenth St., No. 19, is to be remodelled at a cost of about $5,000; Messrs. Robinson & Wallace, contractors.

Factory. — On Fifty-eighth Street, a brick factory is to be built for Messrs. Wm. Clusser & Co., 50 by 100 feet. Mr. Wm. Kuhles, architect.

Houses. — On Fifty-ninth Street, between Eighth and Ninth Avenues, four brown-stone flats are to be built by Mr. F Heerlein, at a cost of about $70,000. Two are 20′ by 88′, and the others 30′ by 88′. Mr. William José is the architect.

Mr. Wm. Kuhles has drawn plans for Mr. Jno. J. Freedman for a house, stable, and riding-school, on West One Hundred and Twenty-fifth Street, near Sixth Avenue. The house will be of brick, with stone finish.

Malt Storage House. — For Mr. Edward Schweyer, a malt storage house of brick, 25 by 100 feet, is to be built on Ninth Avenue, near Forty-third Street, at a cost of about $14,000. It will be six stories high. Mr. Wm. José, architect.

Soho School-House. — A Catholic school-house is to be built on Eighty-seventh Street. Mr. A. H. Blankenstein is the architect.

Store. — Messrs. Degraaf & Taylor, of 47 West Fourteenth Street, have purchased the building, No. 58 West Fifteenth Street, in the rear of their present store. They will rebuild, giving them a front of 25 feet on Fifteenth Street. They will raise the building they at present occupy to five stories. Mr. George E. Harding is the architect.

Philadelphia.

Asylum. — Sanders Street, corner Powelton Avenue, one three-story building (Old Men's Home), 48 by 95 feet; architects, Wilson Brothers & Co.; contractor, H. T. Richards; cost not given.

Factories. — *Third* and Dauphin Sts., 1 boiler-house, 39′ x 25′, 1 three-st'y factory, 41′ x 114′; wing, 32′ x 90′; owners and builders, the Enterprise Manufacturing Co.; cost not given.

South St. and Schuylkill River. 1 two-st'y factory, 48′ x 150′, for the National Fire Brick Works; C. Capehart, contractor; cost not given.

Houses. — *Broad St.*, below Federal, 1 three-st'y brown-stone dwell., 21′ x 87′; John Risdale, owner; contractor, J. S. Culbertson; cost, $12,000.

Twenty-fourth, cor. Thompson St., 7 three-st'y dwells., 8 two-st'y dwells., 1 three-st'y store; each, 18′ x 40′; owner, J. L. Caven, architect, Willis G. Hale; cost, $26,000.

Thirty-eighth, cor. Centre St., 2 three-st'y dwells., pressed brick fronts, 60′ x 18′: owner, J. O'Neil; contractor, T. H. Doan; cost, $7,000.

Thirty-third and Story Sts., 4 three-st'y brick dwells., each 16′ x 44′; owner and builder, H. B. Chapman; cost, $8,000.

Twenty-first, cor. Spruce St., 1 two-st'y and mansard, brick and brown-stone dwell., 19′ 6″ x 80′; owner, Lucien Moss; contractor, Benj. Ketcham; cost, $16,000; architect, G. W. Hewitt.

Review of the Month. — The Building Inspectors issued 175 permits during the month of February for the construction of new buildings and alteration of old structures. Of these permits 66 were given for alterations and additions, 26 for back buildings, 4 for one-story stores, 1 for two-story store, 7 for three-story stores and dwellings, 1 for four-story store, 3 for five-story stores, 21 for two-story dwellings, 20 for three-story dwellings, 7 factories, 1 warehouse, 1 boiler-house, 2 storehouses, 3 offices, 1 knitting-mill, 6 stables, 2 shops, 1 ice-house, 1 slaughter-house, and 1 dye-house.

Messrs. Wilson Brothers & Company have been appointed inspecting engineers for bridges and viaducts, now under contract with the Edgemoore Iron Company, of this city, for the South Australian Government.

St. Louis.

Building Permits. — Thirty permits have been issued since our last report, of which ten are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows: —

Owners.	Use.	Stories.	Rooms.	Cost.
W. Ocker.	Dwelling.	2	6	$3,700
H. E. Crawford.	Dwelling.	2	10	10,000
Miss Mary Yeager.	Dwelling.	3	12	8,500
H. Jurgens.	Dwelling.	2	15	5,000
C. Walter.	Dwelling.	2	5	3,000
D. F. Prior.	Dwelling.	2	6	4,000
G. H. Sudhoff.	Dwelling.	2	6	4,000
J. D. Perry.	Dwelling.	3	16	20,000
D. R. Francis.	Dwelling.	3	16	10,000

General Notes.

Annapolis, Md. — C. H. Roney, architect, of Philadelphia, last fall made plans for a large summer hotel a Tolles Point, three miles below Annapolis The building will be three stories, 56 by 96 feet; wing, 72 by 58 feet; pavilion, 50 by 34 feet; owners, the Chesapeake Bay Steamboat Company. Work will be commenced at once; contractor, George Payne, Philadelphia.

Avoca, Io. — F. Rosenau, architect, of Council Bluffs, Io., has just finished plans for a house for M. H. Verver, Esq., to cost, $4,000.

Bellows Falls, Vt. — In the spring Moore & Ames are to build a paper-mill, 135 feet long, 50 feet wide, with an L 100 feet in length.

A new woollen-mill is also projected.

Binghamton, N. Y. — The Delaware & Hudson Company does not intend to build a new passenger depot here, but only an engine-house and freight depot.

Bridgewater, Mass. — The Prison Commissioners propose to build, at the State Farm, a reformatory prison for male convicts. The estimated cost is $25,000, and the idea is to put up a prison which will accommodate from 75 to 100 prisoners.

Camden, N. J. — The wharf and buildings for the new depot of the Camden & Atlantic Railroad at Cooper Point are being pushed rapidly forward, and will be ready for occupancy by the opening of next season.

Canajoharie, N. Y. — The contractors will commence to build the new Methodist church about April 1.

Council Bluffs, Io. — Max Mohn is building a new hotel, cost $12,000, from designs prepared by F. Rosenau, architect.

C. Lauzerdorfer is building a house to cost $8,000; F. R senau is the architect.

Fred Rosenau, architect, has just prepared plans for a block of stores, 40 by 100 feet, three stories, for Hon. Horace Everett, to cost $10,000.

Detroit, Mich. — Mrs. Dena Boland, addition to brick hotel, 89 Atwater Street; cost, $1,700.

James Anderson, brick dwell., 45 Miami Avenue; cost, $2,800.

Mr. M. A. Edwards, brick dwell., 55 Edmund Street; cost, $1,000.

C. P. Rabaut, brick dwell., 183 Henry Street; cost, $5,000.

Milo A. Smith, 5 frame dwells. and one brick dwell., two on Second Street, near Canfield Street, the others on Canfield Street; cost, $14,000.

Dubuque, Io. — F. D. Hyde, architect, has plans under way for the following work: —

Addition to the residence of F. D. Start, Esq., to cost $2,500.

Mansard roof and other alterations to the residence of Franklin Hinds, Esq., to cost about $3,000.

New front and other improvements to the Thedeuga Block, to cost about $1,200.

Sexton's cottage, chapel, and entrance gates at Linwood Cemetery, to cost about $3,500.

The *Telegraph* says the building season will open with only about 70,000 brick in the hands of the manufacturers. Sellers are asking $7 per 1,000. The price last year was $3.90 and $4.

Flemington, N. J. — G. W. Hewitt, architect, of Philadelphia, has just finished plans for a church to cost about $3,000.

Harlan, Io. — Fred Rosenau, architect, of Council Bluffs, Io., has prepared plans for a block of stores, 60 by 80 feet, for James Long, Esq., to cost $10,000.

C. J. & D M. Myland have commenced to build a new bank building. The front will be of cut stone, tile panels, and terra-cotta cornice; cost, $8,000. F. Rosenau, of Council Bluffs, Io., is the architect.

J. B. Stutsman is preparing to build a block of stores, cost $5,000, from designs prepared by F. Rosenau, architect, of Council Bluffs, Io.

Housatonic, Mass. — The Monument Mills Company is to build an addition 100 feet long to the north end of No 1 mill.

Lake, N. Y. — Alexander Brothers are building a new flax mill in place of one recently burned.

Louisville, Ky. — Kentucky Distilling Company, one-st'y frame cattle stable on Story Ave., near the Shelbyville Pike: cost, $2,500.

T. Hollenkamp, to alter two-st'y brick store and dwell., Second and College Sts.; cost. $2,500.

Dr. J. T. Berry, to alter two-st'y brick stable on Second St, between Main and Market Sts.; cost, $1,100.

Adam Schuster, one-st'y brick dwell., cor. Hancock and Mechanic Sts.; cost, $1,800.

James Mitchell, to alter one-st'y brick dwell., on Fifth, between Breckinridge and Kentucky Sts; cost, $1,600.

Louisville Building Company, two-and-a-half-st'y brick dwell., cor. Sixth and Breckinridge Sts.; cost, $5,500.

Lowell, Mass. — The Prescott Mills are to have an addition 20 feet in width, five stories high, made to one of their mills, and they are also to increase their weaving mill by two stories.

Whitehead & Atherton are to build their new machine shop the coming summer. It is to be 200 by 45 feet, three stories high.

The Tremont and Suffolk Mills are to build a new mill, 282 feet long, 55 feet wide, five stories high, and a new storehouse, 190 feet long, 80 feet wide, and five stories high.

Lynch, Md. — A new Methodist Protestant church is to be built here.

Manchester, N. H. — A joint-stock opera-house company has been formed here, and will begin building in the spring.

Naugatuck, Conn. — The Goodyear India Rubber Company is to build two new shops.

New Haven, Conn. — C Mix is building a block on the corner of Hill and West Water Streets, to be of brick, with marble finish: three stories; for stores and tenements.

New London, Conn. — The scythe company is to build a new shop, 120 by 38 feet, and several houses for employees.

Niantic, Conn. — The Sturtevant Woollen Mill, burned recently, is to be immediately rebuilt.

Norfolk, Va. — Messrs. Niernsee & Son, architects, of Baltimore, are preparing plans for the opera-house which is to be built by H. D. Van Wyck.

Olean, N. Y. — Mr. Barre, of the Exchange National Bank, thinks of building a new bank building.

Palmyra, N. J. — A large piece of ground has been purchased by the Pennsylvania Railway Company, contiguous to their station, on which is soon to be built a depot.

Pawtucket, R. I. — Littlefield Brothers are building a new mill for manufacturing threads and yarn.

Salem, N. J. — Mr. G. W. Hewitt, architect, of Philadelphia, has made plans for alterations to a church; cost, $5,500.

Santa Rosa, Cal. — A committee of architects, having examined the court-house, pronounced it unsafe, as with a crowd in the court-room the floor is liable to go down; to temporarily give relief to the present pressure upon the walls, the cupola has been taken down.

Springfield, O. — In addition to the new passenger depot, the Pan-Handle officials are to make alterations in the freight-house also.

Stoneham, Mass. — The chapel soon to be built by the Congregationalists is to cost $2,600.

Taunton, Mass. — Rhodes & Sons are to build an addition to their shoe button manufacturing establishment.

Washington, D. C. — Mr. J. C. Cady, architect, of New York, is preparing plans for a double brick house, to cost in the neighborhood of $20,000.

Wilkinsonville, Mass. — The Sutton Cotton Manufacturing Company is to build a new mill three stories high, 65 by 60 feet, and an addition to the old mill of 35 by 30 feet, one story high.

Willimantic, Conn. — The Willimantic Linen Company has broken ground for a new one-story mill, 840 feet long and 168 feet wide, with L's for the engine-room, picker-room, and finishing-room. It will cover about three and a half acres.

Wilmington, Ill. — Messrs. J. C. Cogan are to establish cutlery works here.

Bids and Contracts.

Boston, Mass. — Proposals lately received by the Water Board, to supply cast-iron water-pipe, were as follows: —

COCHITUATE.

Warren Foundry and Machine Co., of Phillipsburg, N J	$52,748 75
R. D. Wood & Co., of Philadelphia	54,718 75
A. H. McNeale & Brother, of Burlington, N. J.	36,430 50
Jesse W. Starr, of Camden, N. J	46,270 00

MYSTIC.

The Warren Foundry and Machine Co., of Phillipsburg, N. J	$10,724 50
R. D. Wood & Co., of Philadelphia	11,379 00
Gloucester Iron Works, of Gloucester, N. J	12,350 00
A. H. McNeale & Brother, Burlington, N. J.	11,599 00
Jesse W. Starr, Camden, N. J	9,880 00

Both contracts were awarded to Jesse W. Starr, of Camden, N. J.

The Committee on Improved Sewerage has recently awarded the contract for building Old Harbor Pier, beyond the pumping station at Old Harbor Point, to Edwards, Deery, Cavanagh Brothers, and Sylvester, Boston parties, for $197,809.30. The other bidders were as follows: J. V. Quackenbush, Mohawk, N. Y., $199,929; W. H. Ward, Lowell, Mass., $201,380; Trumbull Granite Company, $215,622.65; W. C. McClellan, Springfield, Mass., $241,827; J. B. Dacey & Co., Boston, Mass., $256,745; Cumminsky, McDuffee & Co., Boston and Lawrence, $275,421.25. By the terms of the accepted proposal the work on the pier will be done at the following rates: Rip-rap, per ton, 88 cents; ballasting, per yard, $1.10; gravel filling, 55 cents per yard; dredging, $2,660; vertical piles, each, $8 58; inclined piles, $5.50; hard pine capping, per thousand, $44; spruce planking, per thousand, $24.20; granite masonry, per yard, $17.60; concrete, $4.40; brick masonry, $15 40.

Lenox, Mass. — P. H. Mullaney & Bro., of Pittsfield, have the contract for the stone for the addition to the residence of ex-Secretary Robeson, at Lenox, to be built this summer.

New York, N. Y. — The Warren Foundry and Machine Company has received the contracts for furnishing cast-iron water pipes and special castings, to the amount of $73,849.

The contract for building a club-house for the New York Jockey Club, on Coney Island, has been taken by Messrs. Austin, Corbin & Co. Messrs. Lord & Breese are the architects.

Mr. E. Snediker, of Brooklyn, is the contractor for the large hotel which is to be built at Manhattan Beach after the designs of Messrs. Wm. Field & Son, also of Brooklyn. The hotel will contain 409 bed-rooms.

Winona, Minn. — The City Council has awarded the bridge contract to John Stellwagon for $6,880, rip-rapping $5 per cord, he being the lowest of ten bidders.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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WE hear with great regret, as will all persons who have any interest in archæology, the report that the German Government will not renew its provision for the excavations at Olympia, which expires by limitation this year. The excavations were undertaken five years ago at the instigation of the historian Curtius, who had for a quarter of a century treasured up the idea, inherited from Winckelmann, of searching under the deposits of the Alphæus for remains of the sacred structures of Olympia. Curtius, who was sent to Greece in 1874 to negotiate for permission to excavate under authority of the German Empire, arranged for the explorations, as may be remembered, on terms which dealt most handsomely with the Greek Government, leaving to it all the material results of the searches, and reserving for the Germans only the satisfaction of advancing scholarship, the right to casts of what should be found and to duplicates, and the glory of the undertaking, which was untransferable. The Reichstag voted about forty thousand dollars a year to the researches for five years, appointed a board of directors, and began work in October, 1875. The more or less hasty examinations of previous explorers had discovered the site of the great temple of Zeus, from which a French expedition had already, in 1829, brought back one or two of the metopes, this was made the centre of the new exploration, the first object of which was to trace the outline and contents of the sacred grove, or Altis, which enclosed the most revered buildings of the Greeks.

OF the splendid results of these researches the whole world knows. Since the discoveries of Layard, at Nineveh, nothing of the kind has made so great an impression on students or added so much to scholarship, or given such interesting verifications and explanations of the accounts of the ancient writers, especially Pausanias, whose minute account of the topography and architecture of Olympia has received many very curious elucidations in the course of the researches. Of these the most striking was the finding of the Hermes of Praxiteles, one of the noblest pieces of Greek sculpture ever discovered, which was found just in the part of the temple where the account of Pausanias led the explorers to look for it, and was identified beyond the possibility of doubt by its correspondence with his description. The many other valuable sculptures found, coming from the gables of the great temple and elsewhere, with the thousands of other objects, bronzes, inscriptions, coins, votive offerings, and architectural fragments, connecting themselves as they do with the very central traditions of Greek history and Greek art, have an interest which is absolutely unique. To these are to be added the architectural value of the discovered plans and the restoration of the sacred buildings; the great temple of Zeus itself, almost the largest in Greece, greatly exceeding the Parthenon in scale, though not in dimensions; the Heraion or temple of Juno, notable for its unusually elongated plan, a hexastyle temple with sixteen columns on the flanks; the circular Phillippeion, the Metroön, the Treasuries, the remarkable semicircular Exedra of Herodes Atticus, and other noteworthy buildings of brick. The pedestal of Phidias's famous chryselephantine statue of Zeus has been indentified, and even as we write we learn of the identification of the great altar of Zeus, and the discovery of what is called the tomb of Pelops. Much the greater part of the work of exploring has been done, but parts of the site still remain unexamined. The value of what has been found is an indication of the value of what may yet come to light. Now that the excavations have gone so far, and with the splendid results shown in the three superb volumes published by the authority of the German Government, as well as by the casts of discovered sculptures which have already travelled even to this country, it would be a grievous disappointment to scholars and archæologists if the work should be given over unfinished.

THERE is satisfaction for American archæologists, not unmixed with chagrin, in the announcement that Mr. Pierre Lorillard, of New York, proposes to bear the expense of an expedition to explore the antiquities of Central America, and that he proposes to do it under the patronage of the French Government, and with its assistance, giving everything of archæological importance that he may find and be able to remove to fill a museum at Paris, which will be called the Musée Lorillard. At the risk of helping to inflame minds that are suffering from the application of the Monroe doctrine to the isthmus canal, we must say that here is another case in which the French have shown themselves alive to interests which we have left lying neglected at our doors. Since the publications of Stephens and Catherwood, in spite of the efforts on a small scale of a few individual Americans and a few interested natives of Yucatan, no discoveries or examinations have been published which are complete enough to give much insight into the antiquities of Central America except the handsome series of photographs from the buildings of the country, issued two or three years ago by the French Government after the explorations of M. Charnaz, who, it is said, will take the lead in Mr. Lorillard's expedition. In point of fact Americans have on the whole been singularly indifferent to the archæology of their own continent, while the investigations which have been made up to this time, even the fruitful ones of Stephens and Catherwood, have been those of men unversed in architecture. So that the great buildings of Yucatan are yet to be studied on the spot by persons with an eye trained to their architectural significance.

PERHAPS for the present we may gracefully allow that the results of an exploring expedition will be put to better use in the hands of the French than in our own, and may solace ourselves for the loss as well as we can with this reflection. How much it may be found possible to carry to Paris for the Musée Lorillard is not to be easily foreseen. The authorities of Yucatan, though they are contented to let the antiquities of their country decay neglected before their eyes rather than take pains to collect or preserve them, have shown some sense of their value and unwillingness to let them go when they have seen them in the hands of more enterprising people. We know, at least, that Dr. le Plongeon, a recent enthusiastic explorer, after a long and bitter struggle with the Government found himself obliged to give up to it the relics which he had laboriously exhumed. Possibly an exploring expedition backed by the dignity of a powerful foreign government might fare better. With the countenance of our own Government and a reasonable interest on the part of some wealthy Americans, such as Mr. Lorillard has shown, we might, it may be, have enriched the Smithsonian and Peabody Museums, and encouraged the scholars who have them in charge, with valuable collections from Central America. Here was a field, which, it seems to us, the new Archæological Institute of America might profitably have entered instead of proposing to turn its first attention to the archæology of the eastern continent, at which so many and so able hands are already at work. An enterprising body of this kind, taking advantage of the private liberality which could, perhaps, have been aroused, might possibly have reserved to itself the creditable work of investigating and interpreting the remarkable architecture of Uxmal, Palenque, and Chichen-Itza.

THERE has been no such enticing opportunity offered to collectors for a long time as the sale of the Demidoff collection,

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which was to take place last week. This collection, the work of the late Prince Demidoff, has for many years been famous among connoisseurs and visitors to the Villa Demidoff, at San Donato, near Florence, and is in its kind perhaps unequalled among private collections. It contains pictures, sculptures, and an enormous quantity of furniture and bric-à-brac; the work of Italian and French artists of the Renaissance and later years. The collection is notable for its Dutch and Flemish pictures; among them are several Ruysdaels, other pictures by Teniers and Terburg, with one or two Rembrandts, a Rubens, and a Van Dyck: many of them are said to have suffered at the hands of picture cleaners. There are also sculptures by Luca della Robbia, Donatello, and Giovanni di Bologna; bronzes, statuettes, reliefs, carvings, vases, and other ceramics; candelabra, terra-cottas, enamels, vestments, tapestries, embroideries, cabinets, caskets, clocks, ornaments, and relics innumerable, the accumulation rather of a luxurious amateur than of a systematic collector. Among the special rarities are the throne of Julian de' Medici, the sword of Francis I., some extraordinarily elaborate pictures in mosaic by Barberi, and an original portrait of Louis XVI., by Callet. The late prince seems to have been an ardent Napoleonist, and had filled rooms with memorials of the Napoleon family, of which he formerly kept a collection at Elba. These include portrait-statues, busts, and paintings of the great emperor at all stages of his career, and of the chief members of his family, — Canova's statue of his mother, and bust of his sister Pauline, are there, — with a great number of his personal effects, clothes, table furniture, ornaments, and, most curious of all, a relic incongruously suggestive of canonization, one of his milk-teeth, set in pearls. The sale has naturally made a considerable stir among collectors, and draws to Florence a concourse of curio-hunters, as well as emissaries from the great museums. The late numbers of *L'Art* have been full of descriptions and illustrations of the collection. An illustrated catalogue has been published in two forms, the ordinary edition sold for fifty francs, and an *édition de luxe* for one hundred; the proceeds of the catalogue are to be divided between the poor of Florence and the new façade of the Duomo.

The question of elevated railways has worried the people of Boston this winter for the second time. It has been argued for some time before a legislative committee, and has taken no less than nineteen hearings to develop itself, with the probable result that those who have petitioned for the railways will have leave to withdraw. Those who have argued in their favor seem to have done so with but small recognition of the differences in cities which make such means of communication suitable to some and unsuitable to others. New York, indeed, where the roads were first adopted, is of a peculiar formation, out of which these means of communication naturally developed themselves, so that they were necessarily successful, and except for the iniquity of allowing them to injure private property without compensation to its owners, the injuries wrought by them were to be necessarily condoned for the sake of their benefits. New York is a long, narrow city, in which all the travel is in the same directions up and down the island. It has several parallel thoroughfares which may be used indifferently for the traffic to and fro, and are wide enough to endure a considerable amount of obstruction. The whole movement of the city is up and down these parallel streets, and it was easy to separate it into its elements, and distribute these into different channels.

In most cities the conditions are different, — in Boston especially so. There the traffic diverges in every direction from the centre: the suburbs, grouped round a reëntrant angle in the coast line, radiate through nearly three fourths of a circle about the business quarter. Although the current is greater on some of these main radiating lines than on others, there are none so subordinate that they could be left out of any such general scheme of communication as the introduction of elevated roads must necessarily lead to. There is also no such concentration of passengers along one or two lines as made some resource of this kind imperative in New York, nor can there be until Boston grows as large as several New Yorks. No doubt an elevated road in any direction would be convenient to those who travelled on it; but to accommodate the travellers to and from the city, as those of New York are accommodated, there would have to be so many roads running off in all directions from the centre as to be an intolerable annoyance, we should think. In fact, so rapidly do the lines of travel diverge outwards, and so generally is the suburban population distributed over the circle, that nothing less than a complete spider's web of rails would give the people of the suburbs of Boston the quick and fairly equal access to the lines which is their recommendation to the people of upper New York. There is, for a like reason, no such system of avenues to choose from, as in New York. There is commonly but one great thoroughfare for each direction, and that not a wide one, and where there are two that are parallel, like Washington and Tremont Streets, they are so occupied and so important that it would be suicidal to give them up to the uses of an elevated road. Boston, in fact, is so built, and so used by her population, that she has almost no streets which lead anywhere that she could afford to give up to such purposes. Fortunately for her, she is exempt from the peremptory need that New York has been obliged to satisfy, at such great cost to herself and with scandalous injury to some of her inhabitants. Fortunately, too, she has, besides her many lines of horse railways, her nine steam railroads radiating to different parts of her expanding suburbs, and subdividing, as they spread apart, into many branches.

The opinion given at one of the legislative hearings by the chief engineer of the New York Sixth Avenue road, albeit unexpected and somewhat disconcerting to those who elicited it, seems to us the reasonable one: that elevated roads should not be resorted to where any other satisfactory means of communication can be secured, and that Boston has no need of them. If it were necessary to pierce such a city by a road to run constant trains, the reasonable thing to do would be to avoid the streets and follow the example of London by putting it under ground. Unfortunately a great part of Boston is probably too near the sea level to allow of this. The necessary improvement of her suburban communications is to be sought rather, we think, in a better use of the railroads that already exist, and in the interpolation, at one or two wide gaps, of narrow-gauge roads, placed, not in the air, but where railroads naturally lie most comfortably, on the ground. It is always difficult to approach the busy parts of a city without making trouble by grade crossings. But there still remain one or two of these lines by which roads might be brought pretty well into the city without great inconvenience. One is the margin of the South Bay, so called; another might probably be found along the shore of Charles River.

The expected lock-out among the piano-makers of New York has begun. The strikers from Steinway's factory persist in refusing the terms offered by the firm, and a dozen of the principal manufacturers in the trade have joined with Messrs. Steinway in the lock-out, which throws forty-five hundred men out of employment, in a struggle in which the masters are prepared to hold out a year if necessary, it is said. This is most unfortunate, and apparently unnecessary, for it appears that at the issue the dissatisfaction was more nominal than real, the Steinways having offered a scale of wages which was a substantial advance, and the men, being for the most part ready to accept, were only held back by the authority of the union. The condition of the building trades in New York is most unsettled, the men pressing everywhere for higher wages, and striking in case of resistance; while capitalists, deterred by the prospect of a great rise in prices, are beginning to make up their minds to put off building till the market is more favorable. The troubles among the manufacturing towns in New England are increasing. In San Francisco twenty or thirty thousand men are said to have enrolled themselves for protection, and there is a proposal to impeach the mayor, in the face of which Kearney and his followers have become quite tame. He has now been sentenced, to his great surprise, to six months' imprisonment and a fine of a thousand dollars for using obscene and seditious language in his speeches, — against which he has appealed.

GOVERNMENT TESTS OF WROUGHT-IRON AND CHAIN-CABLES. II.

We come now to the cable. Its strength is only that of its weakest link. The cable-link consists of a round bolt, bent into an oval form, with its ends welded together. A stud or stay is introduced between the sides to keep them apart and to prevent kinking. In forming the link, the ends of the bolts are twice reheated and hammered, — once to make the scarfs, and once to make the welds; the

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butt end of the link is also heated once for bending. The process of bending injures many irons, and the re-heating and forging of the ends lowers the elastic limit and the strength. The stud, being comparatively incompressible, alters the nature of the strains. The ideally perfect link should have twice the tensile resistance of the bolt from which it was made, and the nearer the tested link-strength approaches to this limit of 200 per cent of the bolt-strength the more suitable the iron, and the more perfect the manufacture. The weak part of the link is generally at the weld. In the rupture of 435 links, 333 broke at the weld end, 86 at the butt end, and 16 on the side. Experiments indicated that nothing was gained by changing the location of the weld. These results agree with what we should have anticipated. As far back as the building of the tubular bridge over the Menai Strait, a series of experiments led to the conclusion that welding was not to be trusted in bridges. In later pages of the report before us, this subject of welding is resumed and fully discussed, and the effect of various foreign elements, as carbon, copper, phosphorus, sulphur, is specially considered. It is stated that two per cent of copper will almost prevent a weld, and even one per cent of carbon greatly impairs welding power. A thin film of oxide of iron will prevent a weld. Welding by fusion is one thing, and welding at a plastic heat is quite a different thing. The term "*welding-heat*" is a very loose one, varying with different kinds of iron. Welding is ordinarily carried on in an oxidizing atmosphere; in a non-oxidizing atmosphere, the temperature might be indefinitely raised and a perfect weld effected. "The ordinary practice of welding is capable of radical improvements; the fact has been fully demonstrated; the means should be made the subject of complete experiments."

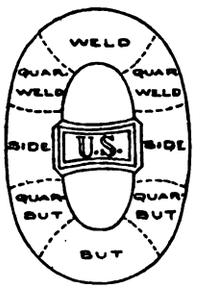

Fig. 2.

The next point, and it is one to which we would invite special attention, — believing, as we do, that it will upset the preconceived notions of most, if not all, of our readers, — is this: *that an unstudded link is stronger than a studded one.* Rankine, in his Manual of Machinery, says, "An unstudded chain has about two thirds of the strength of a studded chain of the same diameter of wire." John Anderson, LL. D., superintendent of machinery to the War Department, Woolwich, in a work published in 1872, says, "It is to be noted, whatever the explanation may be, that the stayed-link chain, when made of the same diameter of iron as the open link, is stronger than the other in the proportion of nine to six. The office of the stud is to prevent the collapse of the link, and thereby intercept the shearing action due to the wedge action of one link within the other." The truth of these statements has never, to our knowledge, been called in question, either in England or in this country, and we think that large cables are universally manufactured with the stud: yet Commander Beardslee does not hesitate to say, "Theoretically, it should not be stronger, actually it is weaker, than the open link." He argues that in the unstudded link the sides have a tendency to become parallel, and thus to place themselves in the best possible position to resist stress, while "the ends are so closed together that the stress is received and transmitted through bearing surfaces much greater than before the parts had yielded to stress." We should admit the force of this reasoning so far as the sides are concerned, but with regard to the ends we think there may be some question, and, in fact, as shown by the tables, none of the links gave way by weakness of the sides, — in other words, no links come up to the 200 per cent to which we have before called attention. It cannot be supposed that the stud was adopted, and such superior strength claimed for it by the authorities quoted, except after what were considered, at the time, satisfactory experiments; and we cannot resist the impression that the discordant results now noted are due solely to the differences in manufacture which the report itself points out. The English use for chain-cables iron of great tenacity, and the studs to their links are made of *malleable* iron. In the experiments here considered, although the iron was sometimes of high tenacity, and at other times of medium or low tenacity, but with great ductility and power of flexure, the studs were in every case of *cast-iron.*

When the iron was of a soft ductile type, the unstudded link had an excess of strength averaging fifteen per cent; in iron of a coarse, hard type it was about five per cent. The experiments are admirably planned to bring out the comparative merits of the two systems, and, however theories may differ as built up from them, the experimental facts lose nothing of their value. The links were arranged in sections, one open between two studded, with end-links of larger section but poorer iron. This system was pulled until one link broke, the pair remaining was again pulled until one broke, the unbroken remaining link was then broken. In every case where both open and studded links were connected the studded link broke. The open link frequently withstood the stress which broke the end-link of larger section, but of poorer iron, and twice that which broke the shackle-pin of steel. The unstudded link here exceeded the studded fifteen per cent, and the quality of iron was such that even the studded cable, of $1\frac{1}{8}$ inches, of which one hundred and fifty fathoms would weigh five tons, was superior to the contract-iron cable of $1\frac{7}{8}$ inches, weighing eight tons. It was frequently the case that a studded link became an open one, by the stud splitting and flying out. There is no escape from the conclusion that, "From the facts recorded, we feel that we are justified in saying that, beyond doubt, when made of American bar-iron, with cast-iron studs, the studded link is inferior to the unstudded one in strength. Therefore we place the stud as next to the weld among the elements which tend to prevent the individual links from developing the utmost possible strength."

In testing cables, sections of five links were used, the first, third,

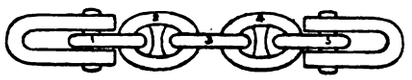

Fig. 3

and fifth open, the second and fourth studded. The shackle pins were oval, and made to correspond with the diameter of the links. The rupture of 229 sections showed that a variation of from five to seventeen per cent may be expected in the strength of ordinary cables, and unless care is used in the selection of the material the variation may rise to twenty-five per cent of the strongest. With iron of moderate tenacity and good welding properties the link should develop from 160 to 175 per cent of the strength of the bar. It is thought that the weight of cables may be reduced. Large bars are weaker than small ones, in proportion to their area, and less able to resist sudden strains. If we suppose links made from $1\frac{5}{8}$ inch and 2 inch bars to have 163 per cent of their respective bar strengths, the cable of $1\frac{5}{8}$ inch will have 71 per cent of the strength of the 2 inch, while its weight is only 65.4 per cent. By the substitution of open for studded links, a saving in weight is obtained which may be put into the bar. Thus an unstudded cable made of bolts of one eighth of an inch larger diameter, would have fully 20 per cent more strength and weigh very little more than the smaller studded cable.

Section VI. is devoted to proof-strains for chain-cables, and is so full of matter that we find it difficult to condense it within the limits of this paper. Every fifteen fathoms section is to be subjected to a tension which shall be great enough to detect any weak link, and not great enough to over-strain any cable, and thus *produce* a defect which did not previously exist. American manufacturers sell their cables with a guaranty that they have been proved in accordance with the standard proof-tables of the British Admiralty. The application of this English standard to American iron is objected to, and the objection is supported by sound argument. For every size of cable the stress is too great, and in its application to different sizes it is unequal. It is based upon the assumption of a tensile strength of 60,000 pounds per square inch in cable bolts of all diameters, whereas few bars of American iron have this strength, and if found in small bars it would not be found in large ones. Moreover it largely exceeds the *elastic limit*, and is therefore likely to weaken the cable. Six sections, of five fathoms each, and of various sizes, were "proved" by the Admiralty table, inspected after proof, and "passed" as sound; but when examined with a magnifying-glass 14 of the 487 links were found to be cracked. But if the present standard is abandoned, something must be set up in its place, which, while ordinarily sufficient, shall also afford a safeguard against inferior material and work. To the elaboration of such a standard the experimenters devoted themselves. After an examination of 210 sections of cables broken by tension, which were made of 15 different irons, and assuming the maximum possible strength of a link to be 200 per cent of that of the bar, the following was adopted as the standard of strength and welding qualities combined: 170 per cent for a maximum, 163 per cent for an average, and 155 per cent for a minimum. An iron which in the link form develops without great variation the average strength is to be regarded as *suitable*; if it falls below the average, or is very irregular in its results, it is *unsuitable.* The highest and most uniform percentage will generally be found in irons of *low tensile strength.* They have generally *high welding* value, and great resilience. In many cases not merely the percentage, but the actual strength of links made of bars of low tensile strength, exceeded that of links made from stronger bars. "There is a widely-spread and deeply-rooted prejudice in favor of the *strong bar* as best adapted to make *strong links.*" It would be so, were it not that this strength comes either from a great amount of work which renders the iron too expensive for cables, or from the presence of some chemical elements which increase tenacity at the expense of welding power. The standard of strength is placed at 50,000 pounds per square inch in the two-inch bar. A table is formed beginning with this number, and as the diameters decrease by sixteenths of an inch, increments, not equal but in an ascending series, are made, until we arrive at 55,600 pounds per square inch for the one-inch bar. By means of this table, the strength of bars of any size may be computed from the tested strength of the smaller bar; then by the percentage belonging to its class we compute the probable strength of the cable. The safe proof-stress should be approximate to the *elastic limit* of the *weakest* link, and this is placed at 50 per cent of its ultimate strength. This rule guards against the probability of *scant* links, whereas, "should there, by accident, be a few links of $1\frac{1}{16}$ inches in a 2-inch cable, the Admiralty proof would strain the strongest of such links

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to over 62 per cent, and the weakest to over 70 per cent of the actual strength.

Section VII. is divided into two parts. The first part consists of notes upon the various irons experimented upon, showing more in detail the effects of working; of reworking and piling; the relation between tensile strength and reduction of area from the pile; the welding properties and the resilience. The second part gives the chemical analysis of the irons, with a comparison of the chemical and physical results, and the effect of the interchanges and substitutions which occur in the various processes of manufacture.

Although this notice has extended much beyond our original limits, it presents but a feeble outline of the many topics treated in this report. The experiments are so illustrated by tabulated results that every one can form his own judgment as to the correctness of the conclusions drawn from them. In view of the recent bridge disasters these matters possess an interest not confined to cable-makers or users. We will not ask how many links are in use at this moment supposed to have 200 per cent of their bar strength; how many machines or structures trust in the strength of welded bars; how many main elements of the various trusses have their strength over-estimated by computations from small bars; we will content ourselves by simply recommending the report to every manufacturer or user of malleable iron.

PROCEEDINGS OF THE THIRTEENTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS. II.

SECOND DAY'S SESSION.

The Convention met at ten A. M. The Auditing Committee reported that they had examined the accounts of the late Treasurer, Mr. R. G. Hatfield, up to the time of his death, and found them correct.

The accounts for the remainder of the year not being at hand, Mr. Le Brun was deputed to receive and examine them at some subsequent time.

After the appointment of a Nominating Committee, consisting of Messrs. Robertson, Stone, Longfellow, Scofield, and Ware, the report of the Committee on Education was presented by Mr. Ware, who read letters from Professors Babcock of Cornell University, and Ricker of the Illinois Industrial University, at Champaign, Illinois, describing their work in their respective institutions. A note had also been received from Professor Lindsey of Princeton.

It appeared that in Princeton, as in the College of the City of New York, architecture was taught, not as in a professional school, but rather as a part of the undergraduate course, the government thinking in both cases that in giving to the study of the arts of design its place in their scheme of liberal education, that of architecture offered qualities, both in itself and in its relations to history, philosophy, and common life, which adapted it better than painting or sculpture to its position in such a scheme, as well as to the minds of the generality of students. The committee had hoped to hear from the university at Syracuse, N. Y, and that of St. Louis. In the latter, they understood that the architectural course had been hampered by its close connection in times past with the engineering department, but in the recent increase of interest in, and means for study of, the fine arts in that city, it was hoped that the university would be able to share so far as to establish its architectural department on a firmer and more independent basis.

As to the architectural work now doing in the Institute of Technology in Boston, Professor Ware reported but little change. The number of students had slightly increased, thirty being now on the books, nine or ten of whom were pursuing the full four years' course of scientific and liberal instruction afforded by the institute, the remainder being special students, following the special short course only. The collection of casts, which formerly occupied one of the rooms of the institute, had been transferred to the Museum of Fine Arts, and its place was to be supplied by a technical collection of materials and appliances, many contributions to which had already been received. Some experiments had been tried, with success, in providing instruction for draughtsmen already employed in offices, with a view to promoting their efficiency in their own work.

The Secretary for Foreign Correspondence, Mr. Longfellow, reported that his official business for the year had been unimportant. The habit of communication with foreign architectural societies seemed to have for some years fallen into desuetude, and there had been no special occasion for renewing it.

Even the interchange of publications had virtually ceased, perhaps owing to the omission of our own publications for the past year, and to the discontinuance of the collections of the Institute, for want of a place to keep them together. He suggested that it was desirable to renew the habit of interchanging publications with other societies, beginning by sending them the Institute publications for the coming year.

The only matter of interest which had come within his province during the year was a letter from the Secretary of Foreign Relations of the new port of Batoum, in Russia, expressing the writer's admiration for American institutions, and of American architecture particularly, and asking for information as to the American methods of building, names of dealers in building materials and appliances, with examples and illustrations of our structures. He added a rather embarrassing question, — to whom he should apply in this country for plans.

In reply to this letter, the Secretary had written that he thought best to request the Supervising Architect of the Treasury Department to send drawings of public buildings, as representing the American modes of construction, and in compliance with this request photographs, perspective drawings, and working plans were to be prepared at the Treasury Department for transmission to Russia. To supplement these Mr. Longfellow said that he knew of nothing better than files of the *American Architect*, and of the New York and Boston Sketch-Books, which he proposed to send with the government drawings. He had also sent the names and addresses of a number of prominent dealers and manufacturers of building appliances. As to the request for the name of an architect, he had referred his correspondent to the plates in the publications sent him, advising him to make his selection for himself from the authors whose names were appended to the designs. He suggested that if some one were wanted to take charge of actual work, it might be the best course to engage an architect to come out, at a fixed salary, and if desired, the Institute would do its best to assist in furnishing a satisfactory candidate.

The report of the Committee on Membership was then read by Mr. Ware, and a prolonged discussion took place in regard to two of its suggestions, one, that the relation now existing between the Institute and the Chapters should be changed, or rather abolished, making the chapters completely independent; the other providing for the reinstatement of former members of the Institute who had been dropped from the rolls for non-payment of dues.

In regard to the first proposition no definite proposal was made by the committee; they wished to obtain an expression of opinion on the subject from the Convention, leaving a plan of action to be drawn up, perhaps, by the trustees. Speaking for the committee, Mr. Ware argued that the condition of the Institute under its present constitution could not be called prosperous, while similar national societies in England and in this country which had adopted the plan of complete independence of the local organizations were found to flourish. The divided duty of members of the Institute under the present arrangement, part being owed to the national and part to the local organization, resulted in the main part of the allegiance of members being given to the smaller body, while their connection with the Institute was felt rather as an unnecessary burden. With the two societies separated, duty to one could not be substituted for duty to the other.

On motion of Mr. Longfellow the matter was committed to the Board of Trustees, with the request that they would communicate with the Chapters upon the subject.

In regard to the reinstatement of members dropped from the rolls for non-payment of dues, the recommendation of the committee that such persons might be allowed, on making application to that effect, to have their past dues remitted, and regain their membership on payment simply of the semi-annual due payable at the time of their readmission, was on motion adopted, and the Secretary was instructed to notify delinquent members of this action.

It was also resolved that the Board of Trustees should be authorized to admit such persons as they might see fit without the formalities prescribed in the by-laws.

Mr. Stone made a report from the Finance Committee to the effect that the resolution passed by the Convention of 1878, laying a special assessment of $8.00 on Fellows and $4.00 on Associates, should be rescinded, and those who had already paid their assessments should be credited with the amount toward their next annual dues. The reason for this action was that, according to the Treasurer's report, the completion of the financial year showed a balance on hand of about $200, and with the dues which might be expected to come in during the year, it was estimated that there would be enough to pay the current expenses, and still permit the refunding of these special assessments. The proposed resolution was put and adopted.

Another resolution presented by the Finance Committee, that the by-law prescribing the penalty to members for non-payment of dues should be appointed for discussion at the next convention, with a view to changing it if it were thought best, was also adopted.

The reading of papers was next in order, the first being by Mr. W. A. Potter, on Some Causes of Failure in American Architectural Design. (See *American Architect*, January 24 and 31, 1880.) Mr. Potter wished, before reading his paper, to forestall the criticisms of those who might imagine from the title of his paper that he considered all American designs to be failures. What he understood to constitute American architecture was the general design of American buildings, taken as a whole, and in this sense the architecture of New York, for example, must be regarded as bad. If it were not so then he did not know in what bad architecture consisted.

After the reading of Mr. Potter's paper the Nominating Committee brought in their report, and the Convention proceeded to the annual election. After the ballots were cast, and pending the count, the Convention adjourned, to meet again at two P. M.

AFTERNOON SESSION.

On reassembling, pursuant to adjournment, the tellers reported the names of the officers elect as follows: President, Thomas U.

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WALTER, of Philadelphia; Treasurer, O. P. Hatfield, New York; Secretary, HENRY M. CONGDON, New York; Secretary for Foreign Correspondence, W. P. P. LONGFELLOW, Cambridge, Mass.; Trustees at Large, C. C. HAIGHT, R. M. HUNT, J. C. CADY, WM. A. POTTER, all of New York; Committee on Publications, E. T. LITTELL, A. J. BLOOR, and R. M. UPJOHN, New York, T. M. CLARK, Boston, J. MCARTHUR, JR., Philadelphia; Committee on Education, Prof. RUSSELL STURGIS, New York, Prof. WM. R. WARE, Boston, Prof. N. CLIFFORD RICKER, Champaign, Ill., JOSEPH M. WILSON, Philadelphia, H. H. RICHARDSON, Brookline, Mass.

Mr. Walter thanked the Convention for its renewed expression of confidence, and in a few remarks pointed out the change which had taken place in the position of architects before the world within a few years. They were now looked upon as the heads of the building world, the guards of the community against bad construction and bad taste. Their duty corresponded with the work expected of them; they should more than ever see to it that what they built did not fall down, and their designs should be prepared, not with a view of pleasing the popular taste of the moment, but as works of true art for all time.

After a vote of thanks to Mr. McArthur for his gift of models of work on the City Building in Philadelphia, the reading of papers was resumed, Professor Watson, of Boston, leading with an essay on Interesting Devices in Construction of Fire-Proof Houses in Paris."

Mr. Cady read a paper by Mr. T. M. Clark, of Boston, on the Typical Sanitary House, and Mr. Ware read one by Mr. E. T. Potter, on the Influence of the Shape of City Lots on the Houses built thereon.

Miscellaneous business was then in order. Mr. McArthur presented an invitation from the Philadelphia Chapter, that the Convention should meet next year in that city. The invitation was accepted, and the thanks of the Convention were voted to the Philadelphia Chapter.

Various resolutions were then offered; one by Mr. Bloor, providing for the appointment of a committee to report at the next convention upon the practice of American architects and builders during the colonial period, and the first fifty years of national independence, was adopted, and Messrs. Mason, of Newport, McKim, of New York, Cady, of New York, and Peabody and Longfellow, of Boston, were appointed as the committee; another, also by Mr. Bloor, providing for the appointment of a committee to consider and report on the best method of solving the tenement-house problem in New York, was adopted, and Messrs. Bloor and Robertson were constituted a committee. On motion of Mr. Stone the Board of Trustees was instructed to consider the matter of amending the by-laws so as to provide for the creation of a grade of non-professional members, and a further authority was given the Board, on motion of Mr. Ware, to print and send to members, from time to time, reports of their conduct of the Institute business. Votes of thanks were then passed to the Equitable Company for their courtesy, and to the Committee of Arrangements, and the Convention then adjourned *sine die*.

THE BACK BAY PARK IN BOSTON.

THE fifth report of the Park Commissioners is a surprise. It relates chiefly to the Back Bay Park, so-called, that somewhat unpromising reservation of a hundred acres of mud-flats upon which so much ingenious and unprofitable labor was expended some two years ago, in the competition whose results were duly noted in your journal at the time. Your readers, at least that portion of them who live in this favored city, have not forgotten the remarkable array of plans exhibited in the City-Hall, plans which differed widely enough in everything except the conviction on which they were founded, that it was possible, without exhausting the resources of landscape-gardening, to convert that region into an attractive and even beautiful, if unambitious, park.

The present report tells us, however, that "serious difficulties" were encountered at the outset, in attempting to carry out the plan which the commissioners had in view, the most important of which related to the occasional ferocity liable to be developed by Stony Brook under the influence of spring floods, the damaging effect of unusually high tides on the turfed and planted slopes of the basin which occupied a considerable portion of the park territory, and the deposit on its surface of "the filthy slime which is usually found where the organic matter of fresh-water streams is first thrown into salt water."

These embarrassments were, after prolonged discussion, finally believed to be so serious as to determine the commissioners to abandon the idea of a park, and "to seek for a form of improvement of a less ambitious character." The first and most natural alternative was an open sheet of salt water as large as the territory in question would allow, reserving only sufficient space around the outer boundary for ample walks and driveways. This plan would, it was thought, meet the first and most troublesome of the difficulties above mentioned, but was finally admitted to be open to the other two. It was therefore modified by raising about one half the surface which the pond was to cover some few inches higher than the water, and making of the whole a sort of artificial marsh. In the words of Mr. Olmsted's report, of which the report of the commissioners is chiefly made up,—

"A covered conduit is to be formed within and near the south-eastern boundary of the property, by which the waters of Stony Brook, when at an ordinary stage, and when the tide is not above the ordinary high-water level in Charles River, will be discharged. When the tide rises above the outlet of this conduit, it is to be self-closing.

"A basin is to be formed into which the waters of Stony Brook will flow whenever the mouth of the conduit is closed, and in which they will be held until the tide falls again below the outlet of the conduit.

"Within this basin there is to be a body of water nearly thirty acres in extent, with outlines as shown in the drawing, resembling those of a salt water creek with coves. This will be tide water, but with no more ebb and flow than is necessary to avoid stagnation, the efflux and reflux being regulated by a self-acting water-gate, the position of which is shown on the extreme right of the drawing. Its surface elevation, under ordinary circumstances, is to correspond with that of Charles River at mean high-water.

"There will also be within the basin a body of level land of nearly equal extent with the water, having an elevation of a few inches higher.

"When freshets occur in Stony Brook coincidently with easterly winds and spring tides, which temporarily prevent an outflow into Charles River, the water of the brook is to be turned into the basin, and the creek, rising, will overflow this level ground. Usually this occurrence could be anticipated, and by drawing down the water of the creek at the preceding ebb of the tide, a rise of more than a foot above the ordinary level avoided. Having when at this height a surface of more than fifty-two acres to spread over, a rise of more than four feet by reason of floods of Stony Brook will not be likely to occur under the most unfavorable circumstances. Even should special precautions be neglected it will not probably happen more than once in ten years, nor will the water ever be liable to stand more than two feet over the ordinary level longer than two hours at a time. As the lighter fresh water will not at once mingle perfectly with the salt, when the body of water is more than two feet above its ordinary level there will be an upper stratum of but moderately brackish water.

"The ground designed to be occasionally overflowed is to be formed of marsh mud with a superficial coating of sand or light gravelly loam through which salt sedges and grasses may grow. Besides the more common vegetation of salt marshes, there is a considerable variety of perennials to which an occasional wash of brackish water does no harm. There is also a good range of shrubs, including beach-plums, berberries, candleberries, cydonias, tamarisks, and the sea-buck thorn.

"Such shrubs and plants are to be grown along the foot of the slope on the margin of the basin and on the small points and islets by which, as will be observed on the drawing, the level ground is here and there broken.

"The wind having nowhere a long sweep upon the water, and the rushy vegetation acting to check wave movement, there will be no swell of importance, and no spray will be thrown beyond these marginal plantations, and immediately above them any desirable trees and shrubs may be safely grown.

"Just what can be accomplished on the level ground may be regarded as doubtful, but it is believed that at the worst it may in a few years be mantled with sedges, rushes, and salt-grasses, with slashes of such golden-rods and asters as are now found in profusion on the tidal banks of the Charles, and the salt marshes at the head of the bay."

Several points in this highly original scheme arrest attention. In the first place, the salt marsh is apparently a device for preventing the salt tide from working injury at its rise to the vegetation on the shores of the pond, and from exposing offensive mud banks at its fall. In another part of his report Mr. Olmsted observes, "The objection was apparent that as in extraordinary tides the water is liable to rise from four to eight feet above its usual high-water level, the sloping face of an earth embankment would at more or less distant intervals be in part submerged and in part washed by waves and spray, and that whenever this occurred any vegetation upon it would be liable to be drowned out or killed by salt."

Now as the surface of the marsh is intended to be raised only six or eight inches above the level of the water "under ordinary circumstances," it is evident that a rise of the tide which exceeded this would reach the slopes by which the marsh is bounded, while a fall of the tide would expose the mud-banks as surely on the low edge of the marsh as at the foot of the higher slopes. But the tide is to be controlled by self-acting gates at Charles River, so that there shall be "no more ebb and flow than is necessary to avoid stagnation." What this limit may be, is, we presume, as yet undetermined; it is not safe to assume it to be so little as to do away with either of the objections which were discovered in the original plan.

In the next place, the aspect of this thirty acres of marsh has evidently been a matter of some anxiety to Mr. Olmsted. Clearly it cannot be made amenable to the ordinary discipline of the landscape gardener, but, the mud once spread, must be left pretty much to nature to clothe as she will. Can she be depended on to do for this bit of journey-work what she does for her own? "Just what may be accomplished on the level ground," says Mr. Olmsted, with a reserve which does him credit, "may be regarded as doubtful."

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"The effect would be novel, certainly, and there may be a momentary question of its dignity and appropriateness." And again, "It may still be questioned whether the bay would not be too much wanting in attractions of popular interest for a public property so near the heart of a city." But this question is answered by the assurance that an unequalled opportunity will be afforded for studying the habits of birds, especially of water fowl, which are expected to abound in great variety among the "rushy glades and bushy islands" of this favored spot.

There is another consideration which we can hardly suppose to have escaped the notice of so experienced a landscapist as Mr. Olmsted. The Charles, though a picturesque stream, is unfortunately not a very clean one, and is not likely to grow cleaner as population thickens along its banks. Its waters are to be admitted to our salt creek and dismissed from it through gates which are expected to repress and control any disposition to the tumultuous rush of a tide which is left free, and to compel a gentle elevation and subsidence of level between the edges of the marsh, while the waters of the streams which now find their outlet through the basin are diverted and led off through dark and secret ways. It follows that there will be no scour whatever in the proposed creek, and we must expect, therefore, a rapid deposit of more or less filthy silt at the bottom, which will require frequent removal at a formidable cost, and of which the portions on the shores left bare at low tide will not fail to make themselves emphatically conspicuous to at least one of the senses of neighboring citizens.

As regards the use of such a park as is here proposed, Mr. Olmsted does not affect to consider it as offering much inducement for anybody to enter upon its domain further than to walk, ride, or drive around its borders. He does, indeed, suggest that, conceding the impossibility of sailing or rowing on such a sheet of water, "a direct line of small omnibus boats could be run between the Back Bay Station of the Albany Railroad at Commonwealth Avenue, and the most distant landing (which is four hundred yards from Chapel Station, Longwood) on a course of a mile and a quarter, in ten or twelve minutes." This is a solemn possibility, whether suggestive rather of business or pleasure one is at a loss to determine; for it seems as likely that a person requiring transportation between these two regions would employ an omnibus boat on this line of travel, as that a pleasure party would choose these low wriggling waters on which to disport themselves, — and no more likely.

Mr. Olmsted has made the mistake — which would not surprise one in a beginner, but which is astonishing in a veteran landscapist — of undertaking to create in a small space, hemmed in narrowly by city streets, a great natural feature. In such a space, out of grass and water we may make a garden, a lawn, a stream, or a pond, and be reasonably certain that nature will not mock at our modest efforts. But a marsh is a feature of the natural landscape which needs, as much as any other, unlimited size. What is it that makes a marsh interesting but the play of light in broad masses, the broad reflections of sky and cloud in the water, the low light, the opposing rise of horizon lines, the opposing colors of horizon hills, seen afar against the sky, the far-reaching and repeated alternations of land and water? These are charms which make us forget or overlook the unloveliness of detail. Well, in Mr. Olmsted's marsh or "fens," as he sometimes prefers calling them, these effects, if they are to be had at all, must be got within a breadth varying from four hundred to nine hundred feet, and confined between close blocks of city houses, which may, perhaps, by great good luck be veiled in a generation or two by the thin foliage of city trees. It does not seem possible (even supposing the attempt at clothing the marsh with some sort of coarse growth, such as Mr. Olmsted permits himself to expect, should be successful) that the result should not be lamentably prosaic if not worse. That it should prove to be, in the words of the report, "positively, permanently, and constantly agreeable" is beyond belief.

If the marsh were already there, it might not be utterly foolish to dig out as much of it as is required to make the basin, and leave the remainder until experience should show it to be an eyesore and a nuisance. That would certainly not be long. But to fill up thirty acres where the tide now flows, and cover it with mud to make such a marsh as this now proposed, would be nothing less than childish. I am willing to believe that the arguments against filling the bulk of the territory to a high grade are sound. But none of them is of any force as against a sheet of water covering the entire sixty acres which Mr. Olmsted has given to his basin, marsh included. Such a sheet of salt water, enclosed by the driveways, the walks, the planted slopes with which Mr. Olmsted surrounds his marsh, would have a beauty and a refreshment of its own without pretence or affectation, needing no apology, — and it would be navigable, not only for Mr. Olmsted's "direct line" between Commonwealth Avenue and Chapel Station, but for swarms of row-boats, little and large, giving animation to the scene, and needed exercise and recreation to hundreds of persons.

Mr. Olmsted's plan for varying the monotony of Commonwealth Avenue, between Chester Square and the Park, seems ingenious and in the main sensible; though it is doubtful if the occupants of houses on the north side of the avenue would be contented with a roadway of no more than twenty feet. That, however, is a detail, and will doubtless be modified if the plan is carried out. The arrangement of the driveways and bridges within the Park seems to be all that could be expected. Σ.

THE CONDITION OF ARCHITECTURE IN THE WESTERN STATES. II.

It is in the large cities that architectural examples are "seen and read." And in these the most predominant are private buildings. They may be broadly classified as business buildings and residences. Business buildings in the large Western cities have, until very recently, been copies of those in New York and Boston. Western architects have only copied the exteriors of the works of their Eastern neighbors. They have failed to adopt the thorough systems of *building* for which New York, especially, is justly noted. Their works have been showy shells, often covering rotten meat. They have copied only that which is least meritorious in their examples. Up to the time of the great fire in Chicago the stone buildings of that city and St. Louis, the largest, and, to travellers, most prominent of Western cities, were, as a class, constructed internally in a manner that no Eastern contractor would risk and no Eastern architect would accept, as to either materials or workmanship. A marked improvement in this respect has taken place in Chicago, but it is still far behind New York, except in one particular, the thickness of walls employed. St. Louis has improved but little. Cincinnati has always been the best built city in the West, and can now show more business structures of good construction and appropriate exterior design than either of the others mentioned. San Francisco, to which our eyes are so often turned for the development of American ideas, unaffected by foreign influences, is what Chicago was fifteen years ago, — a city of unsubstantial glitter.

The constructive element is important in considering the development of architecture in business buildings, because the main desideratum to be considered in their erection is strength. Where this receives due consideration we may always see a tendency in the right direction. But strength, masked by bad art, as may be seen in so much of the business architecure of New York, contributes nothing to architectural progress. In strength made evident to the senses, we find the first dawn of architecture. The better it is expressed, the better the art. It is the artistic expression given to construction which distinguishes architecture from engineering. To decorate construction in a business building is a dangerous practice, but admissible to a certain degree. Moderation in this is the true architect's jewel. As elaboration in design has been the main fault in our business structures, simplicity is the condition to be sought for. Whatever tendency such buildings may have to express their fitness for their several purposes, by convincing us that they have been made strong enough in a natural way, is good so long as simplicity in ornamentation is adhered to. There are a few examples of such buildings in the Western cities, mostly in Cincinnati and Chicago. Their main characteristics are absence of all projections, except of window-sills and at the cornice, and the latter made very slight, squareness of openings, vertical lines of main piers made predominant, horizontal lines made by bond-courses, iron-work made very plain, and cornices of solid material. The style has been used in Chicago in many business buildings of moderate size and cost, and a few of greater pretensions. A store now erecting on the corner of Fifth Avenue and Monroe Street is a good example. Shillito's store in Cincinnati is the most important store-building of the kind that has been erected. Good examples may also be found in Detroit, Indianapolis, and Milwaukee.

Dwelling-house architecture has only within a very few years made a departure from what the *American Architect* calls the "vernacular style." The conventional "brown-stone front" of New York, and the bald brick and marble front of Philadelphia, have had but little influence upon the dwelling-house architecture of Western cities. The "swell-fronts" of Boston have, however, been extensively copied. Used, as they have been in Chicago and St. Louis, on two-story houses, mostly, they present less objectionable street-perspectives than those of Boston, where such houses, three and four stories in height, are built in long rows, suggesting corrugated walls. In Western cities, even where land is dearest, the dwellings are lower and deeper than in those of the East; while to houses of any pretension there is generally alloted an air-space on one side or both. This willingness on the part of property owners to be more liberal in the use of land has given better opportunities for design in domestic architecture, while on the other hand, by reason of the increased cost of houses with exposed sides, the owners have been obliged to economize in the exterior expense. It is noticeable that, whenever parties build for their own use in solid blocks, the fronts are always more expensive in material and more elaborate in design. A man naturally expects to have a given amount of house for the same amount of money, whether his appropriation is expended on three fronts or one. It is evident, therefore, that the isolated house always gives greater opportunities for design. The existence of a great many in any one city conduces to variety, while monotony in design always accompanies the erection of houses in blocks. In the West a larger proportion of houses are built for their owners; and, as every one has either caprice, good taste, bad, or whatever his freak of fancy may be called, we find in this another reason for the variety in design in the houses of such cities. The speculative builder has never found such a field for his genius as in the East. Wherever he operates, he builds the maximum of house on the minimum of lot. In New York he actually sets the fashions, but in the West he has not yet become an autocrat. There he builds houses of moderate pretensions in dozens and half-dozens only. But, as in the

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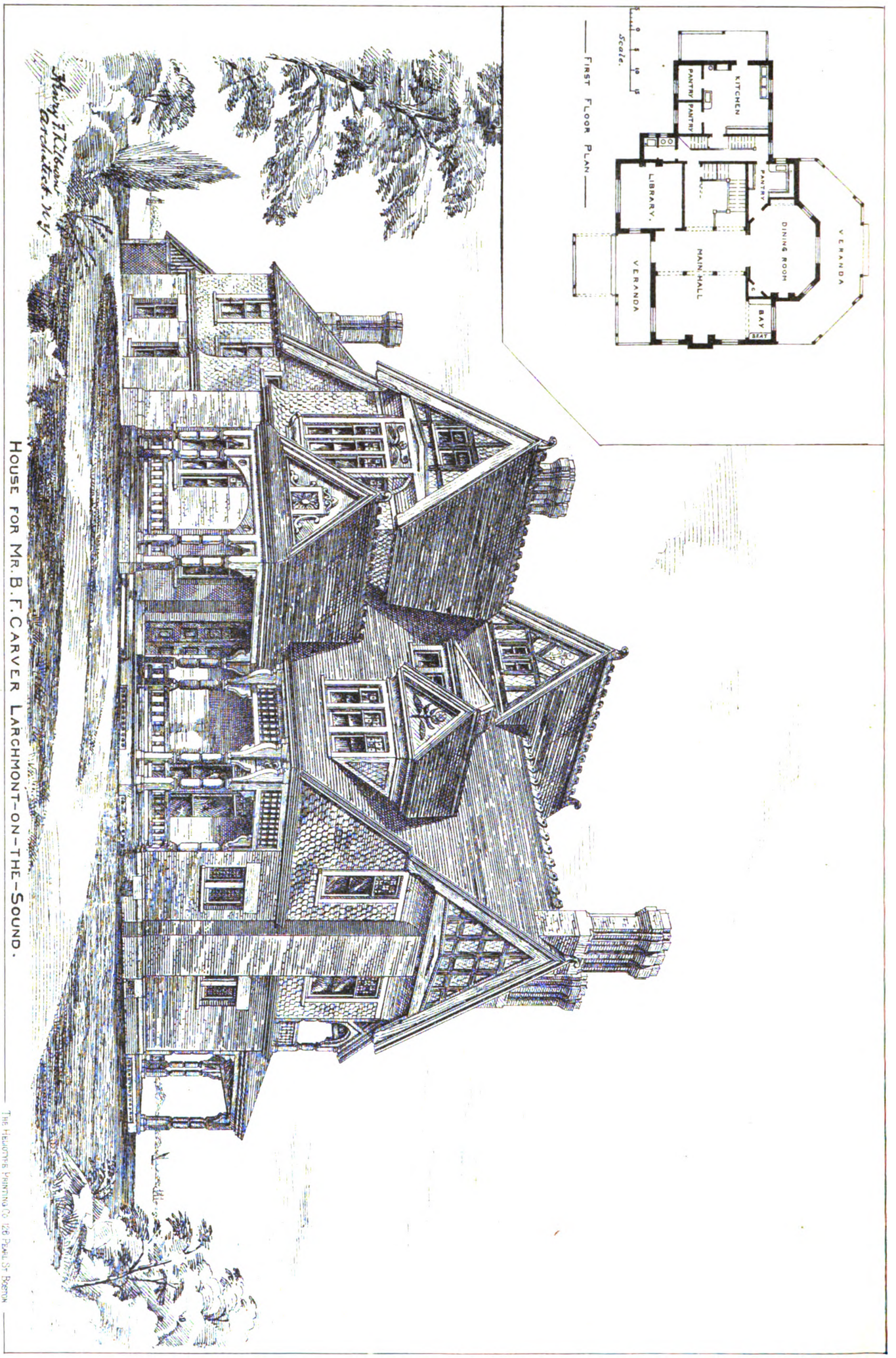

HOUSE FOR MR. B. F. CARVER LARCHMONT-ON-THE-SOUND.

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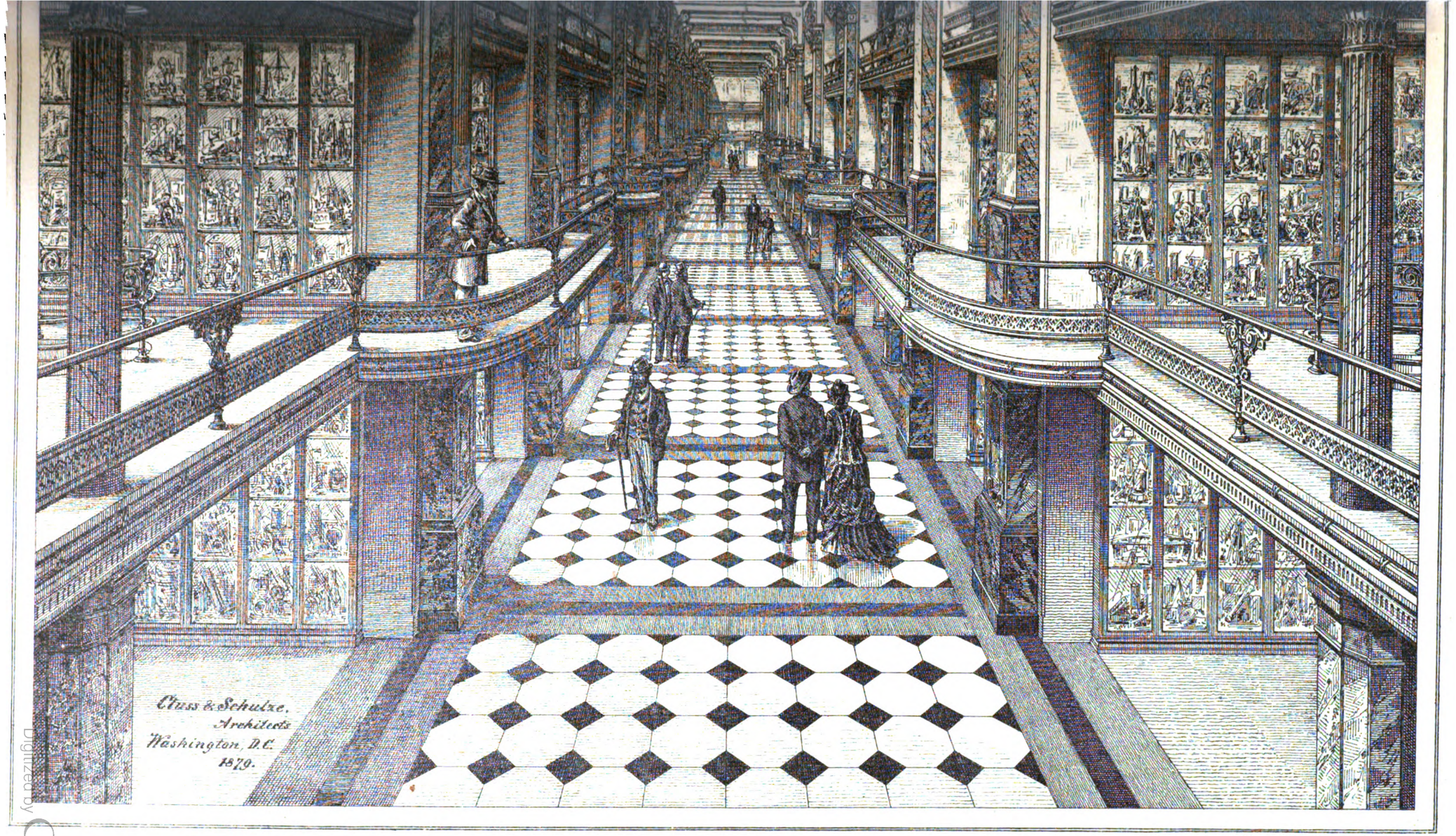

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MODEL-HALL OF THE UNITED STATES PATENT OFFICE, WASHINGTON, D. C.

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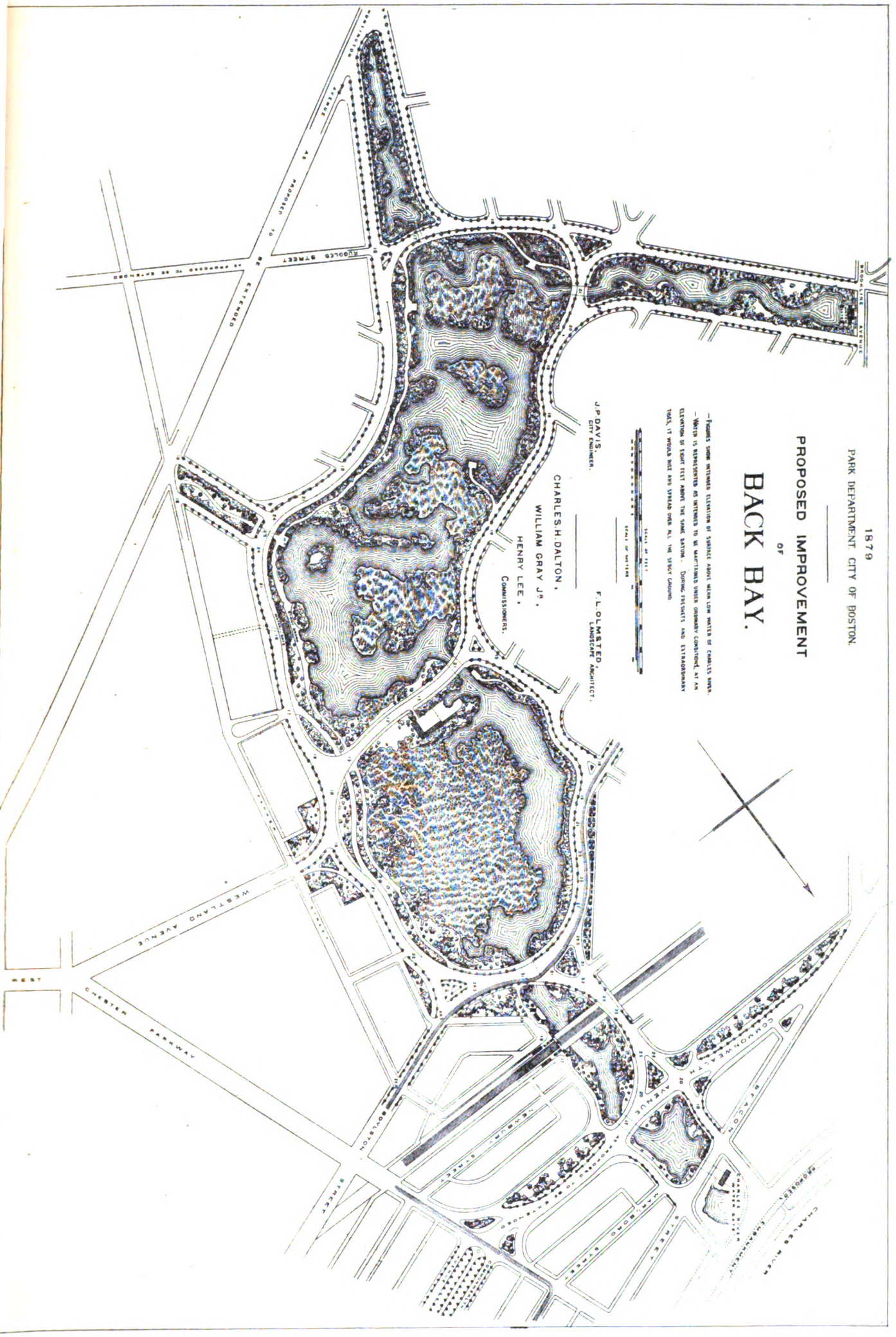
1879
PARK DEPARTMENT. CITY OF BOSTON.
PROPOSED IMPROVEMENT
OF
BACK BAY.
—FIGURES SHOW INTENDED ELEVATION OF SURFACE ABOVE MEAN LOW WATER OF CHARLES RIVER.
—WATER IS REPRESENTED AS INTENDED TO BE MAINTAINED UNDER ORDINARY CONDITIONS, AT AN ELEVATION OF EIGHT FEET ABOVE THE SAME DATUM. DURING FRESHETS AND EXTRAORDINARY TIDES, IT WOULD RISE AND SPREAD OVER ALL THE STUDY GROUND.
SCALE OF FEET
SCALE OF METERS
J.P. DAVIS, CITY ENGINEER.
CHARLES H. DALTON,
WILLIAM GRAY JR.,
HENRY LEE,
COMMISSIONERS.
F.L. OLMSTED, LANDSCAPE ARCHITECT.
WESTLAND AVENUE
CHESTER PARKWAY
HUNTINGTON AVENUE
COMMONWEALTH AVENUE
BEACON STREET
DOVER STREET
CHARLES RIVER

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East, they are always in solid blocks. He generally employs an architect, a practice almost unknown with such people in the East, where it is customary to borrow the copy of some architect's elevation used by himself or his friend in executing a contract. His fronts partake of the prevailing tendencies in design. His buildings only differ from those erected by contract, in that he taxes his ingenuity for cheap methods of doing his inside work. His influence upon architectural progress is as yet but slight.

Dwelling-house architecture in the West has partaken largely of the prevailing tendency to employ so-called Gothic details. A step in advance of this has, however, been made by some architects, in adopting a constructive style best adapted to the materials employed, and setting aside all precedents in the use of detail. The Gothic influence has been most largely felt in these works, but its details are not reproduced. The style is characterized by simplicity in treatment, the almost entire absence of projections from walls, the use of square openings spanned by lintels, and continuous sill and lintel courses. The most expensive and ornate dwellings show a more decided leaning toward the modern English Gothic style, both in general forms and in details. High roofs with gables and elaborate dormers are used, by which effective sky-lines are obtained. These buildings show a decided improvement in design over the two-story houses with "swell-fronts," mansard roofs, and dormer-windows. Formerly, when it was desired to provide a home for some wealthy householder, the only variation from the vernacular style just described consisted in placing rooms on both sides of an entrance hall, and making thereby a double "swell front."

While that indescribable style of house building which we term the "vernacular" still prevails to a great extent through the large Western cities, the attempts of the architects to emancipate themselves from it have, in some cases, led to the introduction of the modern French academic style, treated with considerable freedom. As a modification or improvement on the "vernacular," it is a step in advance, but has none of the characteristics of a natural style, suited to our necessities and adapted to our building materials. In interior decoration a greater improvement is seen than in external architecture. Eastern influences have prevailed through the introduction of Eastern work, which is transportable. But the quantity of imported work is inconsiderable, as the West is quite as quick in finding ways to do its own work as the East is. Its artists and artist-workmen are apt in receiving new ideas and developing them in new forms, and have even sent their products to Eastern markets.

In church architecture the West has made less progress than in any other branch of the art. It is safe to say that the development of church architecture in America has received encouragement from only one religious denomination, the Protestant Episcopal Church, and that denomination is less numerous, proportionally, than any other. It seems to be the only church that values architecture as an adjunct to religious teaching. Its clergy are intelligent amateurs. Its relationship to the Church of England makes dear to it all the hallowed associations of that church, and it claims mediæval architecture as its own. This denomination is not wealthy in the West, and consequently its buildings and its influence are not prominent. But wherever the latter has been felt, it has been attended with good results.

The average Western church of the better class is a combination of a lecture-hall, a school, and a club-house. It is a congregational home for social as well as didactic purposes. In one respect Western churches are more complete than those of other localities; and in this they give evidence of the advance of civilization, if not of æsthetics. They are always well heated and ventilated. They are thoroughly comfortable, and even luxurious. They are, as ministers have been proud to claim, homelike. And perhaps this is a good quality in a country where home ties are less firm than in the East, where the population is less permanent, and where there are so many persons whose homes are far away. It is natural, therefore, that among such congregations the value of architecture as an aid to religious inspiration should be little appreciated, and utilitarian matters should be of first concern. With these reflections, it seems hardly necessary to consider in detail the present condition of church architecture in the West, in its relation to the present condition of the art. It will in time develop new ideas which will be worthy of future consideration.

It may be said in conclusion, that, notwithstanding the crudities and abominations which exist everywhere, as it is perfectly natural that they should, among new communities, like those of many of our Western cities, the present condition of architectural art in them is healthy. Though but few examples of good work may be seen, we may judge best of the present tendencies by that which is now going on and projected. The popular mind in the West seems more inclined to consider that architecture is an art in which the comfort, well-being, and æsthetic education of all is concerned, and not as a matter which cannot be understood, and is therefore to be treated with indifference. The daily papers give it great prominence, and have done much to make its importance known. The fact that the Chicago *Times* of November 2, 1879, devoted an entire page to a carefully written essay on architecture, in which the prevailing faults of the buildings of that city were freely criticised, is a recognition of the value and importance of popularizing the art, which should be applauded by all its votaries. Heretofore architectural criticism has been almost unknown. When the daily press treats the subject in a popular way, and with discrimination, architectural development in the West will be subject to another potent influence, which cannot fail to be fraught with good results. — *P. B. Wight in the American Art Review.*

THE ILLUSTRATIONS.

INTERIOR OF THE MODEL-ROOM OF THE PATENT OFFICE, WASHINGTON, D. C. MESSRS. CLUSS & SCHULZE, ARCHITECTS, WASHINGTON.

AFTER protracted discussions on the reconstruction of the Patent Office, it was decided by Congress that the external architecture should not be changed; that the reconstruction should, as nearly as possible, approach absolute fire-proof work, and that there should be full latitude given in the disposition of the space, as well as in the architecture and decoration within. Footing on these premises, Congress adopted the plans of Messrs. Cluss & Schulze, architects, of Washington, and the work, under the superintendence of the architects, controlled by a board of supervision, whose members are Mr. W. E. Paine, Commissioner of Patents, Lieutenant-Colonel T. L. Casey, U. S. A., and Mr. Edward Clark, the present architect of the Capitol, approaches completion very rapidly. Absolute fire-proof construction was construed to imply the absence of all combustible matter and the protection of all exposed metal-work by thick casings of fire-proof material. In explanation of the illustration of the new design, it is necessary to state that the windows in the old side walls do not reach above half the height of the model-rooms, since they are arranged to suit the exterior architecture of the building. This necessitated recourse to skylights. Hence, continuous double skylights are provided along the centre of the halls, with an intermediate space from which side-light is thrown on and through the galleries. The outer skylight is covered with heavy hammered glass, laid on ropes and cork, the inner one with ribbed glass. The space between the skylights is ventilated so as to prevent sweating by condensation of vapor. The objects on exhibition requiring close inspection, alcoves were arranged on the main floor and on two galleries, with well-holes in the centre of the gallery-floors for the transmission of light to the darker portions of the rooms. False ceilings were carefully avoided. Safety and hygienic advantages were insured by the use of roofing arches formed of hollow fire-proof blocks. By such construction the whole cubic contents of the rooms were secured for useful occupation, and two galleries are introduced where formerly there was but one. To obviate the injurious effects of expansion and contraction experienced with metal roofs of wide span, the halls have been arranged for a central nave and two aisles, by two rows of solid piers which are carried up for the support of the roofs. These piers are spaced transversely, as well as longitudinally, to suit the *points d'appui* in the lower stories, and are built of bonded brickwork laid in Portland cement. The piers are tied, in pairs, by fire-proof wrought-iron girders stretched across the central nave; these are surmounted by decorated pediments. The wide spaces between the piers of each row are subdivided by double wrought and cast iron columns, with intermediate fire-proof filling; these support the galleries, which are constructed of rolled-iron beams with ceilings formed of hollow, fire-proof blocks, and floors of huge slabs of slate. In order to retain the entire space between the middle piers and outside walls, for the fire-proof model-cases, balconies were designed on the first gallery, which project into the nave. The floors of the balconies have not the full thickness of the gallery floors, and even their reduced thickness has been lightened by panels in their underside, seen from below. The interior architecture of the model-room is in modern Renaissance.

The floors of the central naves and communicating passages are laid with marble tiles. The ceilings of the galleries are kept plain, since the model-cases abut against them, and all the spaces between the cases are again relieved by the light-wells. Style is imparted to the piers along both sides of the central nave by facings of the fire-proof equivalent of statuary marble — Keene's marble cement. Substantial pilasters, with raised work, are formed of Egyptian and verd-antique marble under the first gallery. Upon the floor of the first gallery a tier of loftier and more elaborate pilasters is raised with pedestals of verd-antique, fluted shafts of polished Sienna marble, and capitals with superincumbent consoles of Parian marble, the effect of which is enhanced by a moderate amount of gilding for the prominent parts. The merits of Keene's cement have induced an extensive use of it for plastering and floors under the model cases. The ceilings of the halls rest upon coved cornices, and mark the rafter construction of the roof by sunk compartments between moulded styles. The whole coloring of the halls, with the exception of the prominent features in polished and plain marble, is kept in gray; the ceilings in shades of cold gray, the side walls and plain parts of piers in greenish grays, and the finish of windows, doors, and galleries, in warm grays, all with sparing applications of gold. The balustrades of the galleries, as well as the railings of the well-holes and stairs, are bronze. The outside window sashes — the only wood in the halls — are of mahogany. It is to be noted as evidence of the fire-proof condition of the work that no carpenter was on the pay-rolls, nor was any carpenters' work furnished under contract up to the time of hanging the sashes. The fire-proofing is intended to be carried to its legitimate consequences by building the model-cases of light rolled-iron frames and doors, with shelvings of

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heavy fluted glass. Thorough work, satisfactory to the most critical taste, has been attained by expenditures within the appropriations, based upon the revised estimates of the architects.

On March 3, 1879, the funds necessary for the reconstruction were appropriated; they netted $245,800. The sudden revival of the iron industries made it difficult to obtain the heavy quantities of rolled-iron required, but still the building will be restored to its uses by the early part of next summer. Nearly 1,100 tons of iron were consumed; it required twenty-two tons of copper to cover the roofs; the skylights require about 21,000 square feet of hammered or fluted heavy glass; the galleries will be floored with 40,000 square feet of rubbed slabs, and the main floor with 33,000 square feet of marble tiles and Keene's cement.

THE PLAN FOR THE BACK BAY PARK, BOSTON, MASS. MR. F. L. OLMSTED, LANDSCAPE ARCHITECT.

See article elsewhere in this issue.

HOUSE FOR MR. B. F. CARVER, LARCHMONT-ON-THE-SOUND, N. Y. MR. H. F. KILBURN, ARCHITECT, NEW YORK, N. Y.

The walls of the first story are of brick laid in red mortar. The walls above are of wood covered with red-wood shingles, oiled. The roofs are covered with red slate, and the ridges with red terra-cotta cresting. The principal rooms of the first story are to be finished in hard wood, the remainder of the building in white pine oiled and varnished. The upper part of the windows to have stained glass. Owing to the nature of the ground, the first floor of the kitchen part is placed about five feet below that of the main house.

COMMON SENSE IN CHURCH BUILDING.[1]

There is a great deal of common sense in this little book of Mr. Gardner's, as there has been in his previous books. He takes up the question of church building in the light of to-day's experience, — we should rather say of one phase of to-day's experience, — and works out his answers for it, to the satisfaction of certain positive conditions of utility which he finds applicable, and to the neglect of prescriptive forms, fixed associations, and the old habits of church building. His resulting conclusions are in favor of a kind of church the requirements of which have gradually developed themselves in the United States of late years; he decides for an auditorium square, or approximately square, not high, and with a flat ceiling, the pulpit on the longer side and the seats amphitheatrically arranged, to which he adds the Sunday-school room, vestry, parlors, and kitchens which it is becoming a custom to add to churches built for Congregational societies. The book, like the others, is cast in epistolary form. It contains a series of letters from an architect, and others written to him by persons who are interested in the church he is called upon to design, and have their theories, traditions, sentiments, or practical requirements to urge. The theories, traditions, and sentiments are mostly brushed away with little ceremony by the architect, who urges in a lively way the claims of common sense and the practical requirements which he enumerates, as well as the futility or hollowness or triviality of the common predilection for arcaded churches, long naves, open-timbered or vaulted roofs, and stained windows or pictured walls, illustrating his views by several ground-plans of buildings to suit different conditions of site.

There are two natural objections to this way of deciding so general a question. In the first place the traditions of building are not based altogether on sentiment or association or past habit. They contain the teachings of much practical experience, the outcome of a great deal of common sense which is as suited to one age as to another. To throw them all one side and begin, *de novo*, with a fresh enumeration of practical conditions is to run the risk of overlooking the best solution of many difficulties, or of uselessly experimenting with ideas that have been tried and found wanting. In the second place, common sense alone is not a sufficient guide to church building. There are indeed many architectural problems for which it does not reach far enough. In building a warehouse, a factory, or a railway station an architect may work out a satisfactory solution by taking account of practical conditions and nothing else; but when it comes to building a monument, a church, or even a dwelling-house, there are many things besides common sense that actually do influence men, and that properly may, — many feelings, associations, sentiments, that are not individual, but belong to classes and that there is no good reason for ignoring. The architect may properly cast his influence against associations and sentiments that seem to him foolish or misleading, he may resist those that stand in the way of essential things; but when the affections of people are so directly concerned as they commonly are in church matters, he will make a mistake if he takes counsel of common sense alone: practically, an architect who has any heart in his work never does this. Mr. Gardner's architect does not. He turns away from many or most of the devices which are beloved by the sentiments or fashion or caprice of to-day, not with the indifference of the practical man, but with a very decided counter sentiment which he displays in language that is far from unimpassioned, while he shows on his own side prepossessions that are quite apart from questions of common sense.

[1] Common Sense in Church Building, illustrated by Seven Original Plates. By E. C. Gardner, Author of Homes and How to Make Them, Illustrated Homes, and Home Interiors. New York: Bicknell & Comstock. 1880.

Mr. Gardner's book will be better described than by its title, if we call it Common Sense in the Building of one Kind of Churches. The kind, as we have indicated, is that toward which the Congregational churches of the northern United States have for some years been tending, and which is fast developing into a definite type, quite different from anything that is known in history. The central idea, as set forth in this little book, gives the key to Mr. Gardner's treatment, thus: "The chief object in building your church is to afford convenient opportunity for a large number of people to listen to the voice of one man," — or sixty pages further on, more briefly, "to build the most safe, convenient, and commodious room in which to hear a sermon." This does not express the aim of all the people who build churches, nor of the majority of them; but it is that of a large class of congregations, and those who agree in it will find in Mr. Gardner's book a lively and intelligent discussion of the ways of attaining it, while those who think this object important, but not supreme and exclusive, may find many sensible suggestions amusingly set forth with shrewd observation and a rather pungent criticism. The author, indeed, or his architect, having a ready vocabulary and a vivacious way of writing, is a little addicted to what one might call the *argumentum ab adjectivo*, — a little apt, when he has a comparison to decide, to try the question of superiority with one or two brisk adjectives, and treat the matter as settled off-hand.

The book is written rather for a public interested in church building — for country parishes, clergymen, and building committees, we might say — than for architects. It offers no designs, but concerns itself almost entirely with questions of planning and building, and these in an altogether untechnical way, making no account of purely architectural questions. Indeed, it not only avoids technical descriptions, but even shuns the architect's point of view with singular success, so that so far as internal evidence shows, and but for the air of convincing authority ascribed to the architect, it might be the work of an amateur inspired by his experience on building committees, or by a lively popular preacher, or even a builder with a literary turn, rather than by an architect. The architect, however, as well as the persons to whom the book is more directly addressed, will find it easy and entertaining reading.

THE EIDER SHIP CANAL.

The revival of the Eider Canal recalls to mind the once famous Sound-dues which Denmark used to collect from all vessels that passed Elsinore, and which Americans were the first to refuse. The subject was afterward compromised, this country paying to Denmark $408,731, while the other maritime nations paid $17,389,480, Denmark agreeing to keep the lighthouses in order and superintend the pilotage. The Sound has been a free highway ever since; yet Germany proposes to make herself altogether independent of it, commercially and in a military sense, by deepening the old Eider Canal. The latter was constructed from 1777 to 1784; it follows the Eider from Tönning on the German Sea to Rendsburg, and from there runs into the roadstead of Kiel, on the Baltic. The canal proper is not twenty miles in length, about twelve feet deep, a hundred feet wide, and has six locks. It is used chiefly by coasters, about 4,000 a year. It is now proposed to make the canal available for the largest ships bound from the Baltic to the German Sea, and *vice versa*, and particularly for the German war vessels. These objects are of general interest.

The German navy contains over twenty ironclads, among them vessels with an armor ten inches in thickness, with engines of 8,000 horse-power, and with thirty-ton guns. The naval service includes 6,000 men. The war ports are Danzig, Kiel, and Wilhelmshaven, the latter two being the most important and almost directly connected by the canal about to be enlarged for heavy service. The function of Wilhelmshaven is to defend the canal, the Elbe, and the Weser. The place was purchased in 1853 as a mere wilderness, and the port was opened in 1869, having been transformed into one of the best establishments of that kind in existence. It is built of granite, and comprises five separate harbors, dry-docks, ship-yards, and magazines, all that is necessary to build the largest men-of-war. The unhappy "Grosser Kurfürst" was built there. Kiel is almost as important as Wilhelmshaven, and the German Government has expended many millions upon them, intending to defend the empire at all hazards. It will be remembered that the French fleet in 1870 did not dare to attack the German coast. The canal is indispensable if Germany wishes to assure the full efficiency of her navy, and for that reason the execution of the plan is merely a question of time. The advantages to the outside merchantmen bound for the Baltic are equally apparent, the run through the Sound involving numerous delays, while the Eider Ship Canal will naturally result in a more liberal management of the whole Sound navigation. — *Boston Daily Advertiser.*

PHŒNICIAN AND ETRUSCAN DECORATION.

Mr. Newton has bestowed on the system of ornamentation, both of the painted pottery and of the metal objects discovered at Mycenæ and Zalryos, the name of floral decoration, in contradistinction to that of geometrical decoration, which had long been supposed the oldest style of ornamental art in Grecian countries, but which now appears to have succeeded the floral, at all events in the Archipelago and Peloponnesus. The admirable discoveries made by Di Cesnola

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in Cyprus seem to have afforded definite proof of geometrical decoration having been, at a certain period, an importation from Phœnician Asia, a thesis recently upheld by M. Helling, and which I had already put out. Floral decoration, on the contrary, was an indigenous and original attempt, though a coarse and imperfect one, at an ornamentation borrowed from nature, from the plants and animals that the dwellers on Grecian shores had constantly under their eyes. But I am not quite satisfied with the above designation, on account of its expressing a portion only of the essential features of this ornamentation, and neglecting its most original aspect; the share given in it to the imitation of certain classes of the animal world which are not in sequence with the ordinary elements of decoration in the classic ages, as, for instance, butterflies, and, above all, marine productions — fish, cuttle-fish, mollusks — not only copied as to their shells but in themselves. And here may be inserted a very ingenious observation made quite recently by Alessandro Castellani. This distinguished artist has discovered that the typical arrangement of granulæ generally covering plain surfaces in Etruscan ornaments and in those of ancient Grecian style was originally suggested by the protuberances in the sea-urchin's shell. When, in the cases of the departments of Italian jewelry at the exhibition, we compare these shells themselves with copies of antique ornaments exquisitely executed by his brother and himself, the demonstration is complete and doubt impossible. But of these granulated arrangements, that the Etruscans with their fidelity to archaic art continued longer than did the Greeks, we indubitably find the earliest germ — very imperfectly executed — in some of the objects found at Mycenæ and Spata. Thus, then, we have a legacy of primitive civilization, and taste for ornamentation, revealed by these monuments, a last vestige of the period when the Greeks — essentially sailors and fishermen as they were — delighted to copy marine creatures. When the Hellenes, enlightened by the progress of their own taste and by Asiatic models as to the true conditions of artistic ornamentation, had given up imitating the strange and flaccid shapes of soft-bodied mollusks, they still continued to look for copies in the defined and precise lines of their shells. Jewellers no longer imitated, as at first, cuttle-fish, medusæ, nautili, with their inhabitants, but they continued to seek directly for types of regular and elegant granulation in the shell of the sea-urchin, and made frequent use of the form of the scallop-shell in ornamentation. And thus it is that this last vestige of the habits of an anterior period has descended alone through the ages, perfected by a purer feeling for art and a greater technical skill. — *The Contemporary Review.*

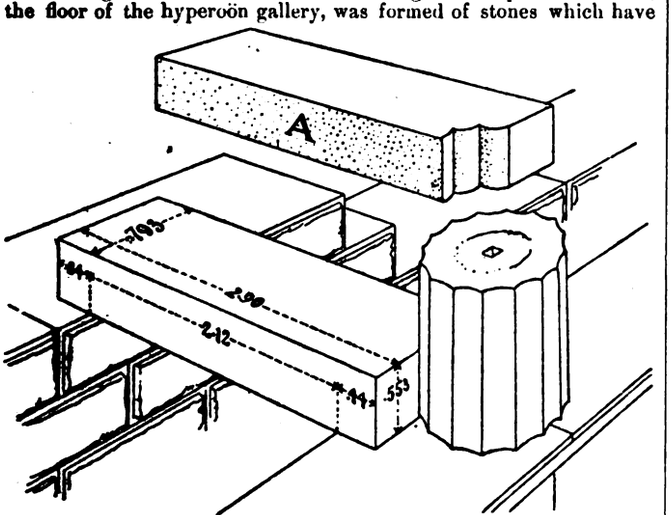
THE HYPÆTHRAL QUESTION.

MUNICH, February, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — Though I do not desire to enter into a controversy concerning the hypæthron which Mr. Clarke has himself publicly declined, I would yet beg for a word concerning another point on which "Mr. Davidson has permitted himself to make positive and incorrect statements." That critic first writes that we have no proof that there were galleries in any temple, save one, Olympia, and existing remains rather discourage than countenance the fact of their having been at all common. More than one fourth part of his second reply is a reaffirmation of this, and amounts to saying that there is no positive proof to the contrary.

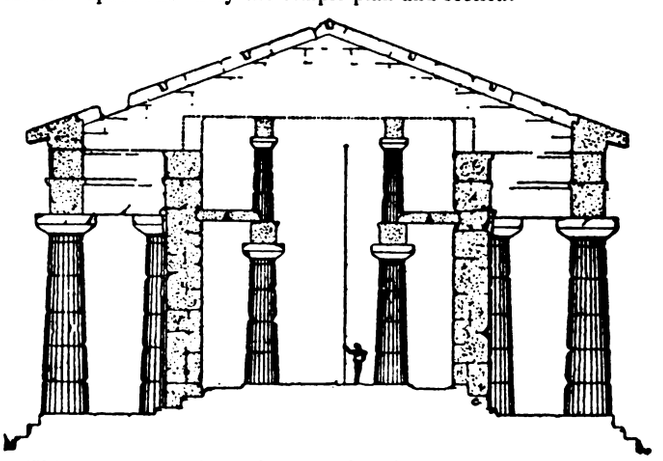
But positive proof is where it might naturally be first sought, — in the best preserved ruins of a Greek temple with interior columns. The ceiling of the lower side aisles of the great temple of Pæstum, the floor of the hyperoön gallery, was formed of stones which have



been accurately published in the authoritative work of Delagardette, with a chapter of description, page 40. (See my *Geschichte des Dorischen Stils*, pages 54 and 72, where a summary of the publications and the ruins is given. The standpoint of the book has, however, in many respects, become incorrect and insufficient by recent advances.) Those abutting upon the upper columns were of the form and of the dimensions shown above.

Seven of these stones, A, have been found. Their peculiar cut fits exactly upon the channels of the shafts. Mr. Davidson, ignorant or neglectful of so conclusive testimony, does away with an objection of Mr. Clarke which, I presume, refers to these well-known stones, by saying that he, Mr. Davidson, examined the ruins of Pæstum with all the care of which he was capable, and yet failed to discover any trace of galleries, which is much the same kind of argument as that urged against the galleries of the Parthenon: they were not mentioned by Pausanias. The passage of Labrouste which he quotes by no means disproves the existence of galleries at Pæstum, and only questions the decided probability of the stone staircases having led to them, on the weak ground that in *other* temples which could have had no galleries from their lack of interior columns, similar means of ascent are found. It is strange if the writings of Labrouste upon Pæstum, which I am unable to consult, make no mention of the questionless existence of these galleries, and it is inexcusable in Mr. Davidson to make so positive statements without taking into consideration the most important authority upon the subject. The quotation from Beulé does not remotely refer to Pæstum, much less to these blocks of the hyperoön.

The temples of the Greeks developed so regularly and logically in their constructive features, that it cannot be taken for granted that the superposed interior columns of the Parthenon (where there are other historical reasons for assuming galleries), the temples of Selinus and Tegea (Paus. viii. 45), were unwarranted and functionless members, while we thus have unquestionable proof that those of Olympia and Pæstum supported the galleries they naturally presuppose. The division of the columns by an entablature at half height would have had no signification if some horizontal tie did not strengthen the tall and tottering mass at this point. The side aisles, if not divided by a floor, would have had a height out of all proportion, and entirely at variance with the clear disposition of the interior space shown by the temple plan and section.



This may be seen by a glance at the above transverse section of the Pæstum temple in its present condition, with the blocks at A restored to their proper place. It is not necessary to refer to the parallel of the ancient basilicas, lying so near at hand, where side galleries existed even when, as in the case of Fanum, there was but one order of interior columns. In justification of Mr. Clarke's original statement, it is finally to be remembered that there were interior columns in all those temples formerly considered hypæthral on the supposed authority of Vitruvius.

I have restricted myself to this one point, not because it was the only misstatement in Mr. Davidson's attack which needs correction. Mr. Clarke's paper upon the hypæthron has attracted much attention, especially after its more accessible republication in England, and Dr. Reber's shorter essay in the *Repertorium für Kunstwissenschaft*. The opinion of competent judges here strongly inclines to its theory of artificial light for the temple interior.

I would close by referring to the weighty indirect support brought by the third and fourth years' excavation in Olympia.

Respectfully yours, DR. P. F. KRELL.

FIRES IN WALLS AND FLOORS.

BOSTON, March 10, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — If your correspondent "A Lay Woman" desires information that may perhaps be applied to dwelling-house construction, with a view to avoiding wooden flues in which fire and vermin may freely range, we shall be glad to explain to her various plans, and to give her the address of one of our best mill constructors who has built his own house in accordance with our rules. We have not yet worked out any general specification for house construction, as our young men are now fully occupied in making plans and specifications for a large number of mill buildings.

Very truly yours, E. A.

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ARCHITECTURAL CRITICISM.

To the Editor of the American Architect:

Dear Sir, — Since your paper was first started I have been an admiring and earnest reader of it, as well as a subscriber, and my interest in its success as well as my own wants have prompted me to write and make a request.

Like most others who have not had the benefit of a metropolitan training, I find my ideas and knowledge exceedingly vague as to what is meant by "balance," "treatment," "proportion," and a thousand other things which belong to the artistic portion of an architect's practice. I suppose that this uncertain feeling comes from the study of examples, etc., without being able to know whether they were good or bad, or what in them was worthy and what not.

It has occurred to me that if you would yourself (or have some competent person do so) take up each week one of your weekly illustrations and critically analyze the design from an artist's standpoint (expressing yourself as if none of your readers knew anything of the subject and you were trying to teach them), showing what were beauties and how obtained, what good proportion and why it is so, what were defects and why they were so, it would be of immense benefit to me, and I feel sure that there are thousands who would hail such a thing with joy. I have done my best to find such things in books, but hitherto have obtained no satisfaction, although I have bought all that I could afford to buy. You may possibly be able to tell me just what I want and where to find it. If you can I will be very much obliged to you. H.

[The want to which our correspondent refers is one which has exercised the editors more than a little. It is just as clear that our American architects need criticism as that they, for the most part, detest it and will not tolerate it. Where architecture is systematically studied — in France, for instance — criticism is habitual. Its principles are understood; it is taken as a matter of course, and accepted as instructive. Americans are thin-skinned, and resent criticism as personal affront, though they take praise kindly enough. Therefore, although it has been suggested to us before that we should print criticisms of the designs that are given us for illustration, we have never dared to undertake it, feeling reasonably sure that under such a system we should soon find ourselves without contributors. We will say, confidentially, to our correspondent that in occasional cases where we have responded to requests of our contributors for criticism of their own performances, our judgments, as honest and considerate as we could make them, have almost uniformly been received with resentment, and commonly with accusations of favoritism. We have made an exception in the case of the designs offered for our competitions, which, being the work of students, and submitted to us for judgment, obviously gave fit occasions for criticism. We have also, from time to time, criticised noteworthy buildings as they have been finished, but our correspondent will, we trust, see the difficulty in the way of offering comment on our ordinary illustrations.

We will, however, take his request to heart, and, so far as we can find opportunity, will try to meet the want which he points out, and of which we recognize the reality. Architectural criticism of real value is, in truth, hard to find, and any clear exposition of its principles harder still. In literature, such as there is is found scattered piecemeal through a variety of writings, according as examples bring out one or another side of it; and a great deal of it, we are sorry to say, is the work of persons who know little of architecture, the easy application of dogmas and theories that are developed out of morals, religion, convenience, or anything rather than a knowledge of art. The best technical criticism that we know of, in a form accessible to readers of English, is to be found in Viollet-le-Duc's Discourses on Architecture. A translation of the first volume of these Discourses, by Mr. Henry Van Brunt, architect, has been published by Messrs. Houghton, Osgood & Co. Both volumes, we believe, have been translated by Mr. Bucknall, an English architect, and published in England. We know of no book of its kind so full of information and suggestion for the architectural student. — Eds. American Architect.]

NOTES AND CLIPPINGS.

The Cost of the Hartford Capitol. — The final report of the capitol commissioners, submitted to the legislature, show stotal receipts of $2,481,518, and total expenditures $2,465,542. The funds still available are $91,077, which covers the amount yet to be paid. They have disagreed with J. G. Batterson, the contractor, who claims $128,943 more than they allow him. Mr. Batterson protests against the report, which he calls pregnant with errors, and says that of the total appropriation but $1,824,607 have gone through his hands, the rest having been expended by the commissioners in violation of the contract. He asks that the legislature appoint a tribunal to decide his claims.

A Mexican Mummy. — At the Hotel Drouot, in Paris, there was sold by auction, two weeks ago, an interesting piece of archæology in the shape of a mummy, which proves to be that of a prince of the ill-fated imperial family of Montezuma. The body, encased in a large crystal box, was purchased for 2,875 francs by the South Kensington Museum. The Montezuma in question was the uncle of the illustrious cacique of that name. Taken prisoner by the Spaniards, he was for many months confined with his daughter in the Mexican convent of San Isidro, and then walled up in a cell by order of the inquisitors. The body now presents the aspect of a dark, yellow wooden statue. As it stands in its glass case, one can understand the terrible sufferings which the poor man underwent in dying. The hands are crossed and contracted, the cheeks hollowed, the eyelids closed and wrinkled, and the hair nearly all gone. The girl, who was about twelve years old, is in a perfect state of preservation. Her face is calm, and a sweet smile seems to play about her lips, in strange incongruity with her horrible fate. The papers telling this strange story are fully authenticated. — *Exchange.*

The Ducal Palace at Venice. — An architect writes to the *Athenæum* that "The attention of the public in England has been so much absorbed with the proposed restoration of the west front of St. Mark's at Venice, that there is danger that the scarcely less important operations in progress and in contemplation at the Ducal Palace, immediately adjoining the famous church, may escape observation. Extensive works in the way of repair and substitution have been going on there for some time past, and have been carried out in a manner which has not escaped severe criticism. It is now proposed to restore the celebrated Porta della Carta, the lovely doorway leading to the Giant's Staircase, down whose steps rolled the head of Marino Faliero. The lintel of this doorway, a most exquisite piece of work, is cracked, but in no danger of falling, nor does it even need to be shored up. It is, however, to be removed, and a new lintel, copied from the original, put in its place. The work has been delayed in consequence of the difficulty of finding a stone of sufficient size for the purpose; but it is much to be feared that unless some serious remonstrance is made, the substitution will be effected, with the approbation of a majority of the Venetians, — the original lintel being, perhaps, preserved in the Correr Museum, which is a kind of *hortus siccus* to which displaced fragments of antiquity are relegated by the Municipality. There is not the slightest excuse for this work, which will destroy the authenticity of a most interesting monument; a simple bar of copper, or a small T-shaped girder, cut into the stone-work of the lintel, and tightly wedged up to it, is all that is required to keep it in its place; and any further work to the doorway is perfectly unnecessary. The Venetians have, however, the impression that it is perfectly justifiable to remove old work and to replace it with new, provided the new work be an exact reproduction of the old; and the architect who has directed the works of restoration at St. Mark's has carried this doctrine so far as to assert publicly that a portion of the pavement in that basilica which has been recently taken up and relaid under his direction is, in his opinion, superior to the original. There can be, therefore, but little hope that the Porta della Carta will be spared the indignity of being made what those gentlemen would consider as good as new, or better. The *Fanfulla* of the 18th of January contains a poem, by Victor Salmini, eulogizing the action of the English in the matter of the west front of St. Mark's, and imploring them to continue their efforts for its preservation."

Iron Bridges of Long Spans. — Speaking of the recent unexplained bridge disasters, a St. Louis journal remarks that half a century ago such spans as the fallen ones of the St. Charles and Tay bridges, for such loads as they were calculated to support, were impossible. Now they are far from being of the first magnitude. There are ten truss-bridges across the Mississippi above St. Louis, which are not regarded as very wonderful structures, and yet seven of them have spans as long as those of the Tay Bridge. The bridges at Winona, La Crosse, Dubuque, Keokuk, and Hannibal have spans of 240, that at Rock Island of 250, and that of Louisiana of 256 feet. The span which gave way at St. Charles was 320 feet in length, yet the same bridge has two spans 406 feet long. Over the same river is a truss-bridge, at Leavenworth, with three spans 340 feet, and another at Glasgow with five of 315 feet. Across the Ohio there is a truss-bridge, at Steubenville, with a span of 320 feet, one at Parkersburg of 320 feet, one at Cincinnati with a span of 515 feet, the longest truss yet built, and one at Louisville with a span of 400 feet. The truss bridge over the Kentucky River, on the Cincinnati & Southern Railroad, has three spans 375 feet in length, resting on iron piers 175 feet high. The bridge over the Hudson at Poughkeepsie has five spans of 500 feet, with piers 135 feet above high-water. In Europe there is a truss-bridge over the Vistula at Grandenz with twelve spans of 300 feet. The truss-bridge of Lessart, in France, has a span of 314 feet, and was pushed across from one abutment to the other after being put together. The bridge over the Rhine at Wesel has four spans of 313 feet. The Kulenburg bridge in Holland, which was the monarch truss before the construction of the Cincinnati bridge, has a span of 492 feet. From these examples it would seem that the St. Charles and Tay bridges, instead of being risky engineering ventures, are entirely within the domain of experience. But, nevertheless, the fact remains that, notwithstanding the boldness with which the engineers of the present day meet the exactions of the locomotive, they are comparatively novices in the use of iron. The first iron bridges were of cast-iron, and soon proved to be too lightly proportioned. The first suspension-bridges were similarly defective. Does it remain to be proved that the wrought-iron work of the past twenty years betrays too great a confidence in the material? Were the St. Charles and Tay disasters unaccountable accidents, or were they fair tests of current engineering theories? These are questions which engineers would do well to discuss.

Marine Railways. — M. Danborg, a French engineer, claims that he has devised a means for transporting large vessels over isthmuses, however steep, and an experiment is shortly to be made at Argenteuil by lifting a ship of 2,000 tons from the river Seine and taking it on rails to another point on the river.

A Large Block of Sandstone. — At the Dark Hollow stone quarry, near Bedford, O., one of the largest stones ever blasted in this country was "lifted" a week or two ago. The stone is forty by fifty feet square and about thirty feet thick, and it required one hundred and eighty-five slip wedges to make a successful blast. When cut up into pieces, it will make nearly three hundred car-loads of building stone. Immense blocks of stone are frequently taken out of the quarries here which would make the stones in Solomon's Temple mere pebbles in comparison. Its weight was estimated to be about 6,000,000 pounds.

An Old English Inn. — Houses often tumble down here before they are 1,000 hours old; but a house which lately tumbled down at Belper, England, had at least the excuse of being 1,000 years old. It was occupied up to last month, and 400 years ago was the only inn in Belper. It was one-storied, with a thatched roof.

A Symphony in Blue and White. — One of Mr. Whistler's "symphonies in blue and white," for which the artist received two hundred guineas, was recently sold under the auctioneer's hammer at Glasgow for twelve pounds ten.

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BUILDING INTELLIGENCE.

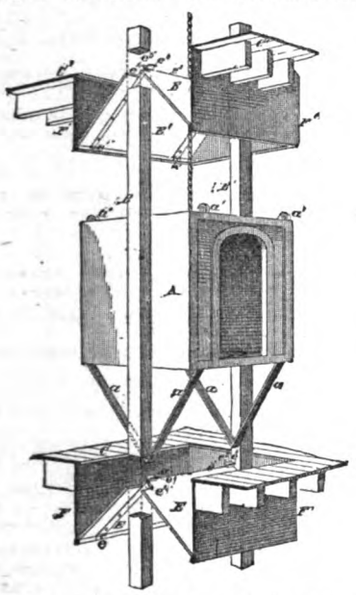
[Reported for the American Architect and Building News.]

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

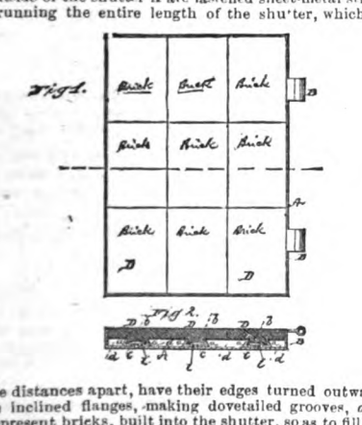
[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

223,284. HATCHWAY. — Elliott E. Furney, St. Louis, Mo. This invention relates to an improved construction for closing the hatchways of an elevator-shaft save when the car is passing. A represents the elevator-car, B B′ are the guides, and C C′ portions of floors of successive stories of the building. E E E′ E′ are the hatches, hinged at e e e^1 e^1 to brackets F F F′ F′, which depend from the floors C C′, respectively, the level of the hinges being sufficiently low and the hatches of such size as, when closed, to be inclined together, as shown, and when opened, by either an ascending or a descending car, to be turned back against the brackets F F′. The hatches are cut



away at their corners e^2 e^2 to fit around the guides C C′. The brackets F F′ form close partitions or walls. At their upper edges, e^3 e^3, the hatches are furnished with flanges e^4 e^5, which extend upward from the edges e^3 e^3, and flare from each other, as shown. The car A, on its under side, at points opposite the lips e^4 e^5, is furnished with wedge-shaped projections a a. On its top are projections a' a', in the form of rollers, which are arranged to encounter the under side of the hatches as the car rises. The operation is as follows: As the car rises the rollers a' a', coming against the hatches overhead, cause the latter to turn on their hinges and open sufficiently for the car to pass. As soon as this has occurred the hatches fall together again. As the car descends the projections a a enter between the diverging lips e^4 e^5, causing the hatches to be turned back toward the brackets, and permitting the car to pass down between them. The hatches then close together again, as before. The principal advantage is, that the floors do not need to be cut into to provide room for the hatches when opened, and no space is occupied by the hatches that is needed for other purposes. Moreover, the hatches do not open downward by any object falling upon them, and do not open at all unless a wedge is inserted between the edges e^3 e^3.

223,401. FIRE-PROOF SHUTTER. — Walton D. Smith, Prophetstown, Ill. This invention relates to fire-proof shutters, built of iron and brick. A represents the body of the shutter, made of sheet iron, with the hinges B B. On the outside of the shutter A are fastened sheet-metal strips, C C, running the entire length of the shutter, which, at



suitable distances apart, have their edges turned outward, to form inclined flanges, making dovetailed grooves, a a. D D represent bricks, built into the shutter, so as to fill the entire outer face, the edges of the shutter being turned to hold the bricks. Each brick D is formed with a longitudinal dovetailed tongue, o, to fit in the dovetailed groove formed by the side flanges, a a, of the strip C. Longitudinal air-chambers, d, are formed by the shutter and the bricks, between the strips C C; and additional air-chambers, i, are formed in the strips C by the tongues b of the bricks being made concave, as shown. These concavities also allow the bricks to pass the rivet-heads by which the strips are fastened to the sheet-metal body A. When the shutter is closed the bricks are on the outside, thus presenting to the fire a surface of brick instead of iron.

225,208. STOVE. — Charles H. Blanchard, St. Louis, Mo.

225,234. HEATING STOVE. — John P. Oeth, Canton, Mo.

225,237. WATER-CONDUCTOR. — George K. Reber, Pittsburgh, Penn.

225,240. STEAM-STOVE. — Samuel Silsbee, Cincinnati, O.

225,265. EXPANSIBLE REAMING BIT. — Adolph Arntz, Muskegon, Mich.

225,283. BRICK-MACHINE. — Collier V. Hemenway, Frank W. Bennett, Thomas W. Kirk, and William H. Bennett, Wellington, O.

225,291. METAL-BORING TOOL. — Lee C. Little, Pittsburgh, Penn.

225,294. HYDRAULIC ELEVATOR. — James R. McPherson, Beloit, Wis.

225,305. SCREW-CUTTING MACHINE. — Benjamin Stott, South Chester, Penn.

225,317. STEAM-COOKING APPARATUS. — John Ashcroft, Brooklyn, N. Y.

225,338. POTTERY SHAPE FOR BUILDING BLOCKS. — Augustine Campbell, Perth Amboy, N. J.

225,339. ADJUSTABLE WINDOW-CORNICE. — James W. Campbell, New York, N. Y.

225,362. WATER-CLOSET. — Moses F. Gale, Brooklyn, N. Y.

225,380. DOOR-CHECK. — Clark Hooper, Caro, Mich.

225,385. SERVICE-PIPE BOX. — Eli H. Hummer and Joseph S. Gemmill, York, Penn.

225,403. ROD AND PIPE CUTTER. — Francis I. Maule, Philadelphia, Penn.

225,415. METAL-BENDING TOOL. — Samuel Patterson, Altoona, Penn.

225,418. BRICK-MACHINE. — James A. Reeder, Corinth, Miss.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since our last report: —

Harry Revin, two-st'y cooper-shop, rear of 134 Eager St., 26′ x 45′.

Peter Ringsdorf, 1 three-st'y and 4 two-st'y brick dwells., Gough St., from intersection of Central Ave.

Mary Dufrin, two-st'y brick building, East Sterrett St., between Columbia Ave. and Ramsay St.

Andrew Hamilton, 5 three-st'y brick buildings, Cumberland St., near Carey St.

John B. Breitschweir, 2 three-st'y brick buildings, Lancaster St., near Broadway.

Union File Co., two-st'y brick building, North St., between Eager and Chase Sts.

B. & O. R. R., three-st'y brick warehouse, cor. Fort Ave. and Harper St., 80′ x 317′.

Mrs. E. J. Joyce, three-st'y brick building, Charles St, between Biddle and John Sts.

H. Heise, three-st'y brick warehouse, Portland St., near Green St., 40′ x 76′.

DISSOLUTION OF PARTNERSHIP. — The old established firm of Dixon & Carson, architects, of this city, has dissolved by mutual consent. Mr. Thos. Dixon will continue the practice of his profession at the old place of business, 18 North Charles Street, and Mr. Charles L. Carson at the corner (southeast) of Charles and Lexington Streets.

STORE AND DWELLING. — Mr. Wm. F. Weber, architect, is preparing a drawing for a new store and dwelling for Mr. Wm. L. Stork, to be built on the corner of Madison Avenue and Wilson Street, of brick, with terra-cotta and Cheat River stone finish, and finished in hard wood, with stained glass windows.

Boston.

BUILDING PERMITS. — Since our last report the building permits granted are as follows: —

Brick. — 131 *Marlboro' St*, for C. W. Freeland, 1 dwell., 30′ x 65′; three stories; I. & H. M. Harmon, builders.

249 *Marlboro' St*, for O. Norcross, Jr., 1 dwell., 25′ x 57′; T. J. Whidden, builder.

84 *Albion St*, 1 dwell., 20′ x 40′; J. Graham, owner and builder; three stories.

221 *Newbury St.*, 1 dwell., 23′ x 51′; three stories; S. W. Merrill, owner and builder.

Bristol St., 1 workshop, 60′ x 60′; five stories; J. S. Blair, owner.

216-230 *Devonshire St.*, cor. Franklin, for Estate of I. Rich, 1 office building, 107′ x 117′; five stories; A. R. Estey, architect.

Vale St., Ward 21, for Dennison & Co., 1 factory, 35′ x 80; three stories.

Columbus Ave., cor. Berwick Park, for G. B. Taylor, 1 tenement-house, 25′ x 87′; four stories; S. Stubbs, builder.

91 *Federal St.*, for G. T. Bigelow, 1 warehouse, 60′ x 172′; four stories; I. & H. M. Harmon, builders.

Wood. — *River St.*, Ward 24, 1 shop, 24′ x 30′; two stories; H. Sullivan, owner and builder.

Brighton Ave., for J. W. Hollis, 2 dwells, 23′ x 33′; J. W. Berry, builder.

478 *Albany St.*, for S. B. Morse, 1 storehouse, 60′ x 105′; McKenzie & Campbell, builders.

Cor. Devon and Fourth Sts., for B. & A. R. R., 1 storehouse, 30′ x 90′; A. H. Glover, builder.

93 *Longwood Ave.*, for Lang & King, 1 stable, 40′ x 60′.

Cor. Dove and F Sts., for E. G. Pond, 1 lumber-house, 82′ x 80′.

Cambridge St., Ward 25, for K. Whittemore, 1 dwell., 32′ x 34′; J. E. Cahill, builder.

Cor. Augustus and Clarendon Aves., for L. Schenckbecker, 1 dwell., 22′ x 28′; A. Schmitt, builder

Vernon St., Ward 19, for P. Diehl, 1 dwell., 22′ x 83′, J. Luippold, builder.

Brooklyn.

BUILDING PERMITS. — *Fulton St., Nos. 1580 and 1582*, 2 one-st'y brick stores, 20′ x 50′; owner, S. B. Chapman, Herkimer St.; architect, Amzi Hill; builder, S. C. Phillips.

Herkimer St., 5 two-st'y frame dwells., 20′ x 36′; owner, C. W. Pead; architect, A. Hill; builders, T. S. Denike and G. F. Stults.

Third Ave., 3 two-st'y frame stores and dwells., 20′ x 40′; owner, James Carroll; builders, A. Willison and Charles Thompson.

Forrest St., cor. Flushing Ave., 1 two-st'y frame dwell., 25′ x 40′; owner and carpenter, Henry Loeffler, 192½ Stockton St.

Fifteenth St., No. 328, 1 two-st'y frame dwell., 16′ 8″ x 36′; cost, $2,000; owner, S. E. Blott, 326 Fifteenth St.; builder, Peter Van Dyke.

Bainbridge St., 1 two-st'y brown-stone dwell., 18′ 9″ x 45′; owner, Margaret C. Given, 55 Canton St.; carpenter, Robert Given; mason, Edward Mullin.

Sumpter St, No. 184, 1 two-and-one-half-st'y tenement, 25′ x 32′; owner, Charles Hartung, 115 McDougal St.; builders, C. Bauer and D. Hess.

Withers St., 3 three-st'y frame tenements, 16′ 4″ x 32′; owner, Mathilde Conrad, 121 Withers St.; architect, John Piatte; builder, Jos. Frisse.

North Fourteenth St., 1 one-st'y brick factory, 75′ x 100′; cost, $5,500; owner, James Stokes, Jr., 37 Madison Ave., New York; architect, Fred Webber; builder, Jas. Rooney.

Gates Ave., 3 four-st'y brown-stone dwells., 18′ x 42′, owner and carpenter, Jas. A. Thompson, 310 Quincy St.

CHURCH. — The Nostrand Avenue M. E. Society proposes to build a church on the corner of Nostrand Avenue and Quincy Street. About $25,000 will be expended. Messrs. Parfitt Brothers are the architects.

Chicago.

BUILDING PERMITS. — *Rumsey St., Nos. 131 and 133*, two-st'y dwell., for John Clark; cost, $4,000.

Cass St, near Indiana, 3 two-st'y dwells., for Thomas Mackin; cost, $10,000.

Monroe St., cor. of Greene, 3 two-st'y dwells., for the Foss Estate; cost $30,000.

State St., near Thirty-sixth, store and dwell., for M. Faby; cost, $3,000.

North La Salle St., No. 595, two-st'y dwell., for J. H. Waters; cost, $6,000.

CORNER IN BRICK. — The North Side Rolling Mills and a "paper car-wheel company" having bought all the brick in the city, amounting to some 5,000,000, the operations in buildings are retarded considerably, the owners suspending action until the arrival of new brick, about May 1.

New York.

BUILDING PERMITS. — *Fifty-ninth St.*, 2 brown-stone front five-st'y apartment-houses, 30′ x 88′ 5″; F. Heerlein, owner; Wm. José, architect; cost, $40,000.

Fifty-ninth St., 2 brown-stone front five-st'y apartment-houses, 20′ x 88′ 5″; F. Heerlein, owner; Wm. José, architect; cost, $30,000.

One Hundred and Twenty-first St., 2 brick four st'y tenements, each 18′ 6½″ x 60′; Cowen Kays, builder; cost, $18,000.

Forty-third St., No. 506, W., 1 brown-stone front five-st'y French flat, 25′ x 58′, 19′ extension; Eliz Pfeiffer, owner; Hendricks & Bros., builders; cost, $15,000.

Eighth Ave., between Forty-ninth and Fiftieth Sts., three-st'y brick stable; Eighth Ave. Railroad, owners and builders; Jno. Correja, architect; cost, $125,000; 200′ x 450′ and 120′.

One Hundred and Seventeenth St., for A. W. Jenny, 3 brick flats, 16′ 8″ x 50′, and extension of 10′; J. H. Valentine, architect; J. Hardwick, builder; cost, $18,000

Fifty-first St., Nos. 641 and 643, W., for J. Schwarzwalder & Son, brick stable, 60′ x 30′; cost, $3,000; S. Holgint, architect; List & Limner, builders.

Sixty-Eighth St, for S. L. Bradley, brown-stone dwell., 22′ x 56′; cost, $25,000; and adjoining, same owner and architect, 1 dwell, 28′ x 86′ 4″; cost, $40,000.

Thirty-ninth St., No. 620, W., dwell., for D. W. Brickwedel, 25′ x 40′; brick; cost, $2,000; W. Schmalz, builder.

Thirty-ninth St., No. 622, W., dwell., with shop, for Geo. Enser, 25′ x 50′; cost, $2,000; W. Schmalz, builder.

ALTERATIONS. — *Fifteenth St., No. 48, W.*, 1 four-st'y brick dwell., additional story and a five-st'y brick extension, 25′ x 45′; internal alterations; cost, $10,000; owners, Degraaf & Taylor; architect, George E. Harding.

Eighth Ave., four-st'y brick store and dwell, internal alterations; cost, $20,000; owners, Vogel Bros.; architect, Charles Baxter.

Fourth Ave, 2 one-st'y brick stores, to be increased to four stories and fitted up for tenements; cost, each, $4,000; owner, C. Grey; architect, Andrew Spence.

Palisade Ave., cor. River Ave., two-st'y frame dwell., to be raised to three stories; cost, $3,500; owner, W. S. Duke; architect, F. C. Withers; masons, J. & G. Stewart; carpenter, S. Francis Quick

Wall St., No. 66, three-st'y brick office building, to be made four stories; cost, not estimated; owners, Howard Fire Ins. Co.; architect, George E. Harney.

One Hundred and Sixty-ninth St., two-st'y frame dwell., internal alterations; cost, $1,800; owner, H. J. Duckhardt, Third Ave. and One Hundred and Sixty-ninth St.; architect, W. W. Gardiner; builder, Erastus F. Dunn.

Broadway, Nos. 924 and 926, 2 four st'y brick stores, three-st'y brick extension built on rear, 40′ x 35′; also, new store front; cost, $10,000; owner, Wakefield Rattan Co.; builders, Robinson & Wallace.

Ninth Ave., No. 575, four-st'y brick store and tenement, two-st'y brick extension, 20′ x 27′; internal alterations; cost, $2,000; owner, Peter Schmidt; architect, John M. Forster.

Fourteenth St., No. 149, five-st'y brick factory, one st'y brick extension, 32′ x 25′; cost, $1,500; owner, Mrs. F. Snow; architect, Joseph M. Dunn; builder, M. E Deegan.

Thirty-fifth St., No. 231, W., four-st'y brick tenement and stable, one and two-st'y brick extension on rear, 22′ x 30′; cost, $2,000; owner and builder, Thomas O'Gara.

Second Ave., No. 799, two-st'y brick tenement and stores, to be raised to four stories, and new store front; cost, $5,000; owner, W. H. H. Moore; builder, W. H. Vanderhoof.

Wall St., No. 48, seven-st'y brick and stone office building, interior alterations; cost, $20,000; owners, Bank of New York; architects, Vaux & Radford; builder, Linus Scudder.

Eighteenth St., No. 36, E., six-st'y brick factory, six-st'y brick extension on rear, 21′ 6″ x 20′; cost, $2,000; owner, W. H. Jackson; builder, W. A. Hankinson.

BUILDING MATERIALS. — The Hudson navigation being now open we can gather some information as to the probable ruling of prices for the spring. Rosendale cement is

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firm at $1.10 per barrel, by the cargo, and the price will no doubt be sustained. Bricks are quoted at $9.50, but without firmness; the market in this article will probably fluctuate considerably. Should the price be high in May it will be very low in the latter part of the summer, as the market would be flooded.

COMPETITIONS. — Nothing has yet been decided in regard to the two large buildings on which competition was invited. The Liverpool and London and Globe Insurance Company has, it is reported, thrown out all except three plans, and it is rumored that a Boston firm are likely to get the building for the Bank of the Republic.

HOUSES. — On Fifty-fifth Street, between Fifth and Madison Avenues, a first-class house is to be built for Mr. Chas. Kneeland. It will cover a lot 25 by 100 feet, and will be of brick and stone; cost is estimated to be about $40,000. Mr. Charles C. Haight is the architect.

Messrs. Silliman & Farnsworth, architects, have drawn the plans and are now receiving estimates for a house to be built for Dr. Thomas on Lexington Avenue and Fifty-second Street. The building will be 28 by 90 feet, six stories high, of brick, terra-cotta, and stone, in the Queen Anne style, and will cost about $40,000.

Messrs. Silliman & Farnsworth are also preparing plans for a dwelling on the adjacent lot, in addition to an apartment-house to be built on Lexington Avenue and Fifty-sixth Street.

LABOR. — There is no doubt that masons and all mechanics in the building interest will demand higher wages on or about April 1. The masons will no doubt obtain $3.00 per day, which was their rate last summer; but should they demand more, there will be trouble. Capital appears ready to make a fair advance when business opens, but any attempt at extortion will be resisted.

SCHOOL-HOUSE. — The trustees of St. Boniface's Church are to build a brick school-house at Nos. 312 and 314 East Forty-seventh Street. The building will be 50 feet in front and 75 in depth, and will be four stories in height. The building is designed by Frederick Jeuth, architect, and will cost, when completed, $20,000.

STORE — Messrs. Vogel Brothers will have built on the southwest corner of Forty-second Street and Eighth Avenue a four-story store and workrooms, to cost about $25,000. The building will be of brick, with stone finish.

Philadelphia.

HOUSES. — *Sixteenth* and Jefferson Sts., four-st'y brown-stone house, 22′ x 90′; day's work; owner, J. H. Smaltz; cost, $16,000; J. C. Sidney & Son, architects.

Fifteenth and Fitzwater Sts., 1 three-st'y brick dwell., 18′ x 50′; owner, Robert Johnson; cost, $3,200.

1117 *Shackamaxen St.*, 1 three-st'y dwell., 20′ x 58′: brick and stone; contractors, Cook & Fannan; cost, $4,800.

STORES. — 2664 *Kensington Ave*, 1 three-st'y store, 22′ x 86′; owner, J. Torpey; cost, $5,000.

1520 *Chestnut St.*, 2 four-st'y stores, 28′ x 163′; owner A. G. Baker; contract not awarded.

Shurs Lane, cor. Main St., three-st'y store and dwell., 20′ x 60′; Thomas Haggerty, contractor; cost, about $4,000.

FACTORIES. — 2840 *Boudinot St.*, 1 two-st'y factory, 34′ x 24′; owner, Wm. Jamison; contract not given.

Linn St., near Twenty-third, four-st'y factory, 40′ x 60′ (addition); owner, J. B. Nelson; cost, about $2,000

SCHOOL-HOUSE. — *Green Lane*, corner Branchtown Road, one two-story school-house, 45 by 44 feet; owners, city; contractor, C. O'Neill.

STABLE. — 760 *South Broad Street*, addition to stable, 17 by 63 feet; owner and builder, P. Reeves; cost, not given.

EXPRESS OFFICES. — The Adams Express Company have purchased the southwest corner of Seventeenth and Chestnut Sts., and will erect a fine building thereon.

St. Louis.

BUILDING PERMITS. — Forty-five permits have been issued since our last report, ten of which are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows: —

Owners.	Use.	Stories.	Rooms.	Cost.
Mrs. R. W. Sive.	Store.	3	3	$9,000
A. Frail.	Dwelling.	2	18	9,000
Mrs. W. Patterson.	Dwelling.	3	18	9,000
M. Sella.	Store.	2	8	3,300
J. Peters.	Furniture factory.	4	4	4,900
Louis Miller.	Dwelling.	2	7	2,800
J. A. Bailey.	Dwelling.	3	9	4,000

General Notes.

ATLANTA, GA. — The Gate City Guards have decided to build a memorial armory.

BLAUVELTVILLE, ROCKLAND CO., N. Y. — Mr. Wm. José, of New York, has prepared designs for an orphan asylum, 50 by 100 feet. It will be of brick with fire-proof stairways, heated by steam, and will cost about $30,000. Mr. De Baun is the contractor.

CHAMBERSBURG, PENN. — Mr. F. E. Davis, architect, Baltimore, has just completed the drawings for a new jail, to cost $20,000.

CHICOPEE FALLS, MASS. — Rev. P. D. Stone is planning to build a parochial school-house at this place.

CHURCHVILLE, MD. — An effort is about to be made to build a Lutheran church in Stony Forest, about two miles from Churchville, Harford County.

CINNAMONSON, N. J. — J. C. Sidney & Son, of Philadelphia, are architects for a three-story, 22 by 90 feet, brick house for Miss Susan Lippincott; cost, $6,000.

The same architects are building one three-story brick dwelling, 38 by 58 feet, for Wm. Parry; contractor, C. R. Pancoast; cost, $6,500.

DETROIT, MICH. — It is a question whether the new school for the blind will be located here or in Adrian.

ENGLEWOOD, N. J. — Messrs. Silliman & Farnsworth, architects, of New York, have drawn plans for a house for Robt. Bayliss, Esq., of same city, president of the Market Bank. It will be of stone, in the Gothic style, and will cost about $15,000. Estimates are now being received.

FAIRFAX COUNTY, VA. — Work has commenced on the new Episcopal Theological Seminary in Fairfax County, Va. The building will be 55 feet 2 inches by 73 feet 7 inches, of brick, trimmed with terra-cotta and Hummelstown brown-stone, and will cost $10,000. Mr. C. E. Cassell, of Baltimore, is the architect, and Joshua Harrison, of Alexandria, Va., the contractor.

FOSTORIA, O. — Brick and stone dwelling, for L. J. Hissong: cost, $4,000; N. B. Bacon, architect, Toledo.

FREDERICKSBURG, VA. — Work has commenced on the French Memorial Chapel. It will be 50 by 70 feet, and will cost $16,000. Mr. C. E. Cassell, of Baltimore, is the architect, and E. J. Labourn and A. M. Garner are the contractors.

GLEN COVE, L. I. — Mr J. C. Cady, of New York, is drawing plans for a frame house to cost $15,000.

HAVERHILL, MASS. — A house in old-fashioned style is building for Mr. Thomas Saunders. Work is done by the day, under superintendence of Mr. J. P. Littlefield. Mr. Wm. R. Emerson, of Boston, is the architect. The building measures 75 by 117 feet.

HILLSDALE, MICH. — Two stores, 50 by 90 feet, for L. Guggenheim; brick and stone; to cost $5,000; N. B. Bacon, architect, Toledo.

HOLYOKE, MASS. — A new school-house, to cost about $12,000, is to be built by the city the coming season.

JAMAICA PLAIN, MASS. — Two houses are to be built this summer on the Greenough estate. Mr. Wm. R. Emerson, of Boston, architect.

LA FAYETTE, IND — Competitive plans for the new court-house for Tippecanoe County were submitted March 9 by seven architects. The building will cost $200,000

LANCASTER, PENN. — Episcopal school, 35 by 65 feet; brick; day's work: cost, $7,000; architects, J. C. Sidney & Son.

LOUISVILLE, KY. — J. C. Lindenberger, three-st'y brick and stone dwell., Fourth St., between Ormsby and Weissinger Aves.; cost, $15,000.

B. L. Swope, two-st'y frame factory on Sixth St., between Breckinridge and Kentucky Sts.; cost, $4,000.

MILTON, MASS. — A house measuring 40 by 112 feet is building for Mr. Robert Stephenson. F. M. Severance is the builder; cost, $15,000; Mr. Wm. R. Emerson, of Boston, is the architect. The sills are now in place.

A stable, measuring 80 by 97 feet, is also to be built on the same estate.

Mr. Emerson is also designing extensive interior alterations in Mr. J. Huntington Wolcott's house. J. H. Burt will carry them out.

MT. GILEAD, O. — A new brick block is to be built by D. G. Poland.

NEWTON, MASS. — A house will be built this summer for Mr. Hatch, from designs of Mr. W. R. Emerson, of Boston.

OAKLAND, CAL. — The architects here are doing very little at present. There is talk of several building improvements of importance for this season but there is small chance of much activity until the labor question is somewhat settled.

New work started since last report is as follows: —

Two-st'y frame residence, with attic and basement, for S. Richards. S. Babson, architect; cost, $2,000.

Two-st'y dwelling for Mrs. W. Smith. J. C. Mathews & Son, architects; cost, $2,300.

Number of frame houses of cost less than $2,000, five. Combined cost, $6,500.

Number of alterations and additions, ten. Cost, $3,200.

Frame house for Mrs. A. Smith. Otto Kleemann, architect; cost, $2,150.

ORTONVILLE, MINN. — An Episcopal church is to be built here this season.

PAWTUCKET, R. I. — Mr. L. B. Darling is to build an opera-house here. It is understood that Messrs. Stone & Carpenter, architects, of Providence, will furnish the plans.

Mr. E. P. Carpenter is building a new house on Summit Street. Carpenter's work, Wilmarth & Mckillap; mason's work, Henry Tinkham; architects, Walker & Gould, of Providence; cost, $7,000.

PROVIDENCE, R. I. — Mr. Daniel B. Waite is building a two-story building, to be used for stores and tenements, on the corner of Prairie Avenue and Lockwood Street. John F. Pitts is the contractor; Geo. C Cady, architect; cost, $5,000.

Mr. Wm. A. Dudley has just commenced a new French roof dwelling on High Street, near Bridgham. Mr. Albert N. Parker is the architect and builder.

ROCKFORD, ILL. — An effort is making among the members of the city council to build a city-hall, city court, and central police station. Negotiations are in progress for the purchase of a lot.

SABULA, IO. — Geo. C Heberling, Esq., is preparing to remodel and enlarge his house; F. D. Hyde, architect, Dubuque.

STATEN ISLAND, N. Y. — Messrs. Wilson Bros. & Co., architects, of New York, are drawing plans for a fine house for Mr. A. Hegewisch. It will be of brick, stone, tile, and terra cotta, with upper portion timber; Queen Anne style.

STAUNTON, ILL. — A proposition has been adopted to build a $10,000 school-house.

TOLEDO, O. — C. L. Reynolds is remodelling his dwelling; cost, $2,000; N. B. Bacon, architect.

Masonic Temple, same place, to cost $40,000; D. W. Gibbs, architect, Toledo.

WAUSEON, O. — City-hall and engine-house; brick and stone; to cost $25,000; D. W. Gibbs, architect, Toledo.

WILLIAMSTOWN, MASS. — The site of the new gymnasium has been staked out, and work will begin on it as soon as possible.

XENIA, O. — City-hall and engine-house: brick and stone; to cost $18,000; D. W. Gibbs, architect, Toledo.

Industrial.

ASHLAND, N. H. — Ambrose Scribner is to put up a large woollen-mill on the site of Pemigewasset paper-mill, burned in 1875.

AUGUSTA, GA. — N. E. McCoy is building a new yarn mill.

The Sibley Manufacturing Company, who propose to build a cotton mill of 24,000 spindles, are getting proposals for machinery.

ERIE, PENN. — Ground was broken in February for a large malleable iron manufactory, which will cover an acre of ground. Prescott Metcalf and John Clemens are the heads of the enterprise.

FALL RIVER, MASS — The Anawan Manufactory contemplates building an addition, which will probably be larger than the present mill.

FISHERSVILLE, N. H. — The Contoocook Cotton Company proposes to build a new mill.

HAWLEY, PA. — Dexter, Lambert & Co., of Paterson, N. J., have purchased the lands and water power along the Paupack Falls, and are to build a factory 500 feet in length, 150 feet wide, and three stories high.

HOLYOKE, MASS. — The new paper-mill, the principal owners of which are J. S. McElwain, of this city, and Aaron Bagg, Jr., of West Springfield, will contain a rag-engine department, 146 by 40 feet, two stories and basement; a bleach boiler department, 66 by 36 feet, two stories and basement; boiler-house, 37 by 34 feet, one story: size-house, 18 by 20 feet, two stories; shavings-room, 16 by 20 feet, two stories; tower, in connection with rag-room, and stock-house for elevator and stairs, 18 by 21 feet; paper machine-room, 144 by 34 feet, with screen-room, 17 by 32 feet, each one story above basement; finishing department, 106 by 44, two stories, with tower 18 by 8 feet in connection for elevator and stairs; stock-house, 106 by 40 feet, two stories. L. P. Bosworth has contract for brick and stone work; Watson Ely does the carpenter-work. Buildings are of brick, with slate roofs, brown-stone finish. D. H. & A. B. Tower are the architects.

Messrs. D. H. & A. B. Tower, mill architects, have nearly finished the plans of the new paper-mill for the Southworth Manufacturing Company of Mittineague. The buildings are as follows: Engine-room, 106 by 32 feet; bleach-house, 33 by 32 feet; finishing department, 90 by 44 feet, all of two stories and a basement, and machine-room one story and basement.

Mr. W. H. Mayberry is about to build a three-st'y block on High Street, of brick, with marble or brown-stone trimmings. It will be used for stores on first floor, and offices above. Cain & Kilburn, architects; Jones Bros., contractors.

LENOX, MASS. — The Smith Paper Company will build their new pulp mill on the old site at Lenox Furnace.

MANCHESTER, N. H. — The Amoskeag Company of Manchester are to build a new gingham mill 400 feet long, four stories high, also a new dye-house 300 feet long, and two stories high.

MAYNARD, MASS. — The Assabet Manufacturing Company has broken ground for a new building, 50 by 90 feet, two stories high.

NEWBURYPORT, MASS. — The Ocean Mills have made contracts for building another large mill, besides a picker-house, boiler-house, and engine-house.

Messrs. E. P. Dodge & Co. will make a very large addition to their shoe manufactory.

A new Bagley hat factory has been contracted for.

PROVIDENCE, R. I. — James E. Crandall is putting up a new building, to be used as a carriage manufactory by him. The building is 37 feet 6 inches by 106 feet, two stories and mansard roof, located on Union Street, between Fountain and Worcester Streets. The drawings were furnished by Leslie Langworthy (with Thompson & Nagle); A. N. Parker, contractor.

RUTLAND, VT. — The Rutland Scale Works are building two new buildings, each 50 by 100 feet.

SHELTON, CONN. — The Shelton Company is preparing to enlarge the bolt works here.

THOMASTON, CONN. — The Plume & Atwood Manufacturing Company has begun work on its new buildings, and the clock company is soon to add 100 feet to the machine shop.

WASHBURN, ME. — Wilson & Shaw are preparing to build a steam sash and blind factory near the starch factory. Building will commence early in the spring.

WATERBURY, CONN. — The Waterbury Brass Company is preparing to build a new brick building same size as the rolling mill, to be used as a wire mill. Another building is to be added on the west of the rolling mill.

WEST AUBURN, ME. — J. Monroe & Co. advertise for proposals for a new shoe factory, 36 by 85 feet, three stories in height, with an engine-house attached.

Public Buildings.

CHARLESTON, W. VA. — Congress has appropriated $75,000 for a public building in this place.

GOVERNMENT BUILDINGS RECOMMENDED. — The many reports from the Committee on Public Buildings recommending the purchase of a site and the construction of buildings in various cities do not carry any appropriation with them. This is left for the Committee on Appropriations to take into consideration. Among the places where the committee recommend public buildings are Toledo, Portsmouth, Maysville, Paducah, and Louisville.

MANITOBA, CAN — It is said to be the intention of the Canadian government to commence the construction of provincial buildings at Manitoba immediately.

PORTSMOUTH, O. — The House Committee on Public Buildings has, upon the representation of Mr. Neal, agreed to recommend an appropriation of $50,000 for beginning a government building in this city.

Bids and Contracts.

DENVER, COL. — Mr. W. H. J. Nichols, architect, has let the contract for building six two st'y houses for Dr. J. M. Walker to Messrs. Halleck & Howard for $23,500.

FRANKLIN, O. — Wm. Burdsall, contractor, of Lebanon, O., has received the award for all the repairs to the Court-House except the brick and cut stone, which goes to Wm. C. Hendrickson & Co. of this city. The whole cost is $8,524.

JEFFERSON, WIS. — The contract for building the new Jefferson County court-house has been let to B. Stevens, of Madison, at $30,890, the work to be completed by December 1 next.

MIDDLETOWN, O. — The contract for the new city buildings has been awarded to J. Margerum & Son. The masonry is to be done by Smith & Wilson.

ONANCOCK, VA. — Mr. Louis McCusker has been awarded the contract for the new Alms House for Accomack County, Va., for $5,750. Wm. F. Weber, architect, of Baltimore.

PHILADELPHIA, PA. — Mr. G. W. Watson has contracted with the Adams Express Company to build a new stable, 150 by 145 feet, four stories high, on the west side of Twenty-second Street, below Market Street, at a cost of $42,000.

TRENTON, N. J. — A rubber mill for Magowan, Fannan & Alpaugh is to be built on line of Pennsylvania Railroad, near Trenton, N. J. Size of main building, 80 by 150 feet. Brick, pilastered. Contract price, $8,300. John V. Snediker, mason, and William Mutchler, carpenter; J. H. Whittaker, architect.

Eight three-st'y brick dwellings for Edward H. Stokes, Esq., to be built on the corner of Ferry and Warren Streets. Contract price, $7,666. Carpenter, Amos A. Randall; mason, John M. Rue; John H. Whittaker, architect.

WEEHAWKEN, N. J. — The contract for the stone house, of which Mr J. C. Cady of New York is the architect, has been awarded to Messrs. Smith & Crane of New York, for the masonry, and to Messrs. W. & T. Lamb, Jr., of Brooklyn, for the carpenter-work. The contract price is $25,000.

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IT is not surprising to hear that the joint Committee of Congress on the Library, on whom, apparently, the decision rests, are at a loss to know to whom to entrust the finishing of Brumidi's frieze in the Rotunda of the Capitol. That the committee should not know what was best in such a case is, in fact, the most natural thing in the world; and if this implied that the decision would be put into the hands of some one who did know we might be very well contented. But it seems to be out of the line of practice of committees to refrain from deciding matters for which they are not qualified. Senator Voorhees, whom the political wheel has brought to the chairmanship of the committee, believes Brumidi's frieze to be a grand work, and we are told that he proposes to send to "the art-centres of Italy, where frescos have always been held in high esteem," for a painter to finish it. This is perhaps as unpromising a way as any of buying a pig in a poke. Although frescos and other mural decorations have been and are held in esteem in Italy, as the traveller who runs may read in the window with a face looking out of it which he may see painted on a blank house-wall in almost any Italian town he runs through; and although there is a grain of truth in the Senator's implication that where frescos are held in higher esteem than they are among us, for instance, they are likely to be, on the whole, better painted, we believe that artists would not agree in holding the present generation of Italian fresco painters in very high esteem, in spite of their facile cleverness, or in counting on them for assistance for any more monumental work than the ceiling of a ball-room or a theatre. Further, we may suppose that since it is not a question of importing a skilled workman, as we might import a glass-blower from Venice, or a milliner from Paris, but of finding the best artist obtainable for a difficult work, the chances that the painter whom we might import to order would prove to be the man we want, when we got him here, are very uncertain.

FEW undertakings, on the whole, have been less successful than the importation of foreign artists for American public works; few things are more unlikely than that we should get any artist of the first rank to come here and paint our Capitol. The *American Architect* has never been a vigorous advocate for protection to native artists, — believing that they will be a stronger race if they grow up unprotected and exposed to foreign competition, — and unquestionably there are many European artists of more skill and power for such work than are to be found in the United States; but between the men whom we can get at home and those whom we should be likely to import, we have no doubt that we should do better at home. But the question of finding a painter to finish Brumidi's work involves the major question whether his work should be finished at all. This we do not like to see taken for granted. The paintings of the Rotunda frieze are called the first real frescos painted in this country, and we presume they are so. There is a natural reluctance to sacrifice a large amount of skilful mechanical work, unique in its kind, which we may lack the mechanical skill to replace; but the only title of this work to exist is as a work of art, and if it fails as a work of art, which we believe it does, there is no reason for retaining it in so conspicuous a place for a mere mechanical curiosity. If the work had been finished there would have been reason for letting it remain until some evident opportunity showed what was the best thing to replace it with. If it had been, as Mr. Voorhees styles it, a grand work, it would have been too precious to efface, however unfinished it might be. Since it is apparently a failure in art, and, as an unfinished thing, a blemish, the best thing would seem to be to courageously efface it, and then we may afford to take breath before we go to work again. When it comes to a permanent decoration, there is a kind of work yet more permanent than fresco, as well as decoratively finer, especially for such a situation, — that is, mosaic. No mosaic work, on a large scale, has yet been executed in this country, and a frieze three hundred feet long would be too grand an undertaking for a first experiment, but we may hope to see such work grow into use among us, and there is no grander opportunity for it than this, for which we can afford to wait.

IT is a misfortune that things which, like matters of art, require special fitness for their decision, should be decided by Congressional committees, selected for entirely different purposes. No one imagines that when the presiding officers of Congress select the Committees on Public Buildings and Grounds, or on the Library, they investigate the artistic cultivation of the members. That an architect, a painter, or a sculptor should turn up in Congress would be an unheard-of thing. If one did, we might be sure that he did not succeed in his profession; and Congressmen are chosen for a training that is almost incompatible with serious cultivation of the decorative side of life. Congress is, indeed, a singularly unfit body to decide questions of æsthetics, and has won a pretty general recognition of its unfitness. But the means of mitigating the Congressional consciousness of universal capability is apparently yet to be discovered, and the fine arts are found to be a peculiarly apt field for the exercise of universal suffrage. Hence Congress, which calls the special knowledge of engineers and other scientific men into consultation, thinks that of artists superfluous. And hence our public questions of art are at the mercy of a body which, whatever its competence for the purposes for which it was chosen, holds in its artistic deliberations only the ideas which have percolated through the whole mass of the community, and is, in matters of art, always a generation behind the age. This means being a long way behind, for in our country art runs fast in its efforts to overtake the foreign countries which have a long way the start of us. It may fairly be said that in matters of art the Government, instead of lending an efficient aid in the advancement of art, is always lagging in the rear. Artists feel their way forward as best they can. The public is gradually awaking to a lively interest in art, and a knowledge of the world's progress is slowly penetrating it; but the whole tendency of government patronage is retrograde among "the most enlightened and progressive nation, etc., etc., ... the world ever saw."

IT seems to us that it would be well, after trying our present system so long as we have, and with confessedly indifferent success, to try a change of method. It is a fair question, indeed, whether it were not better to give up all patronage of art by the Government unless it can be more judiciously distributed. The question of government patronage in art is always a difficult one; but nothing adds more to its difficulties than to put it into the hands of persons who are not educated to it, and whose chief interest and attention are given to other things. We may find some encouragement in the fact that foreign governments, which take the thing in a different way, succeed better. There are two ways open to a government which would employ artists without making any provision for training them. One is simply to employ men who have made their mark in their profession, and are recognized as superior among their fellows. This would save Congress a world of trouble, but it is condemned as undemocratic and un-American, and a death-blow to rising genius. The other way is to put the choice into the hands of persons who are specially qualified by training to be judges, and who therefore do not need to wait for the

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voice of fame. Hardly anything would seem more hopeless than to entrust it to a body of men who were selected for entirely different and even antagonistic purposes; whose whole interest and attention was taken up with other matters; who yet considered themselves beyond the instruction of a general reputation. There is, however, one worse way, and that is our alternative of allowing individual projects to be brought before Congress in the interest of their author, and then decided upon.

There is more difficulty in finding remedies than in discovering faults; but it is clear that the remedy in this case lies in the employment by the Government, under some form or other, of officers specially qualified for this duty. The idea which has been sometimes suggested of a Fine Arts Department in the government seems manifestly out of place, at present, at least. Perhaps the best relief would be found in the appointment of commissions, either occasional or more or less permanent. To appoint them to consider the projects of individuals would doubtless be unsatisfactory, but for particular occasions they might be appointed; or since we have commissioners of various kinds attached to the departments of the government, room might be found for a permanent Commissioner of the Fine Arts, were it not that an office of this kind would at once become the spoil of politics, and so bring us back into some of the difficulties from which we need escape. On the whole, special commissions would probably prove for the present our best resource; and we might hope that if they did not lead to the best results the need of selecting men trained for their work would come to be felt, and that if they were given proper authority we should at least be spared such helpless fumbling as we have seen over the designs for the Washington Monument and the Congressional Library; nor when men selected for such duties had to face the public and justify their selection should we be likely to see the adornment of our Capitol or of the public places of our cities given into the hands of untrained girls and men who stand at the bottom of their profession. At present it is not to the general government or to legislators that our best artists look for recognition. It is the commissioners of a State Capitol, or the building committee of a parish, that employ Mr. Hunt to paint the walls of the Assembly Chamber at Albany, or Mr. La Farge to decorate Trinity Church and St. Thomas's, while Congress votes our thousands for the experiments of Miss Vinnie Ream, or accepts the performances of Mr. Carpenter.

In London it is not a Carpenter, or a Vinnie Ream, or a Brumidi, that has been called on to decorate the South Kensington Museum, but Sir Frederick Leighton, the President of the Royal Academy, who has just finished the great fresco in a lunette of one of the courts. The work brings naturally to mind Mr. Hunt's lunettes at Albany, the shape and size of the paintings being analogous; but the treatment is evidently in strong contrast. Mr. Hunt's designs are simple, — perhaps too simple to hold their own satisfactorily on so large fields, which they but incompletely fill, and against the extreme richness that surrounds them. They are entirely on one plane, almost devoid of background, and contain but few figures. The Kensington painting is apparently a crowded composition, on a scale to provoke comparison with Raphael's School of Athens, the figures being arranged in several planes, those in the foreground larger than life. It typifies the industrial arts applied to war, and represents an Italian armorer's yard in the fifteenth century; and is, it would seem, the most ambitious picture painted by any English artist of this generation. It is a court-yard shut in by a battlemented wall and Gothic gateway, behind which rises a background of Italian houses, tower, and dome, interspersed with cypress and orange trees. The yard is filled with customers, trying on armor or inspecting weapons, with a group of girls embroidering on one side, and smiths hammering in a workshop on the other; while men come and go on the steps leading to the gate, through which appears a knight on horseback, and groups of busy workmen or customers line the balconies and terraces of the near buildings on either hand. The painting has naturally attracted much attention, and is said to be full of variety and animation in the figures, and of splendor of color in the costumes and accessories, for which the subject certainly gives room. It is painted by a new process called spirit fresco, which, according to the *Builder*, should be done by laying the colors, mixed with a vehicle that contains oil of spike and a small amount of wax, upon a very dry and porous surface of plaster, into which the colors sink.

Visitors to New York as well as her citizens will be glad to know that the Metropolitan Museum of Art, after the labor of many months spent in getting its collections in order, is to be opened on the first of April. A museum is a thing of slow growth: none start at once into completeness, but this already has material that deserves serious study in its pictures and ceramics, and one possession at least, the Di Cesnola collection, that foreign museums envy it. Its opening will renew the regret that the Castellani collection was allowed to go back to Europe; and in view of the opportunities that might be given to American scholars by the juxtaposition of the Cypriote and Phœnician relics with those from Central America, American scholars will the more lament that Mr. Lorillard's expedition and its prophetic spoils should go to the credit of the French Government. For the greater *éclat* of the opening a loan collection of Egyptian and other antiquities will be added to the displays of the Museum itself.

The long-delayed Hudson River Tunnel seems at last to be making progress, the shaft in Jersey City being closed in and the work of extending the drift under the river fairly begun. The tunnel is to run from the foot of Fifteenth Street, in Jersey City, where the working shaft is now built, to the opposite foot of Leroy Street in New York, but the ends will be extended for some distance before they come to the surface at Jersey Avenue and Washington Square. The distance under the river is about three quarters of a mile, but the whole length between the termini will be two miles. The lowest point will be one hundred and two feet below the surface of the river, and only twenty beneath its bed. The channel is near the New York shore, and from it the tunnel will rise each way in a continuous grade. The brick-lined shaft, now open, is a cylinder thirty feet in diameter and sixty deep. From here it was first proposed to carry a single tunnel wide enough for a double railroad track, but the instability of the soil through which it is to be driven led to a more cautious plan, and the tunnel is to be built with a double bore, two cylinders of twenty-one feet diameter being carried side by side, and each containing one line of rails. The soil makes great care necessary in the construction, consisting as it does alternately of sand and mud, excepting for about four hundred feet, where the tunnel runs through rock.

The softness of the earth makes it necessary to excavate under pneumatic pressure, and the bore is kept filled with compressed air, the tension of which supports the earth at the head of the tunnel. Duplicate engines force air into the tunnel, where men work night and day in three gangs, the sides of the bore, as fast as it is excavated, being plated with boiler iron, within which is built a ring of hard bricks, a yard thick, laid in cement mortar. The workmen enter and leave by an air-lock which discharges into the shaft, and the excavated earth, softened with water and brought to the mouth of the tunnel, is blown out into the shaft, through pipes, by the tension of the imprisoned air. The work is to be done by electric light. As yet only two or three hundred feet have been pierced, under a forced pressure of less than an atmosphere. The most serious difficulty will be when it comes to excavating beneath the channel, with a roof of only twenty feet of soft earth or mud, under a pressure of three atmospheres.

The suit of Mr. E. E. Myers, architect, of Detroit, against the Indiana State-House Commissioners, claiming damages for unfair action in the competition of plans by which the architect of the building was chosen, and for mutilation of the plans of the plaintiff, has just been brought to a hearing in the U. S. Court at Indianapolis. The important part of the testimony, says a correspondent of the Cincinnati *Commercial*, is the deposition made by Mr. James K. Wilson, one of the experts employed by the commission in the competition, in obedience to the requirement of the legislature. Our readers may remember the excitement made by this competition, the ill blood that was stirred by it, and the complaints of bad dealing that were brought against the commissioners: certainly, if we may make the obvious inferences from Mr. Wilson's testimony, they showed a great determination to "fix things" their own way. The plans, says the testimony, were sifted down to five by the experts, of which Mr. Lee's was by them rated first, Mr. Myers's second, Mr. Eppinghausen's third, and Mr. May's, the selected architect's, fourth. The experts, however, decided that none of the plans was a suitable one to adopt without modification, and the

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committee thereupon directed Mr. Wilson to try to perfect the five plans, beginning with that marked Lucidus Ordo, which was Mr. May's. But when Mr. May's was thus perfected, which was done by Mr. Wilson under protest, the commission directed him to go no farther, and the drawings of the corrected design were taken and put away with the others. Afterwards, as we know, Mr. May's design was chosen. We are not told that the commissioners knew the authorship of the designs, which were sent in under motto, but it would, perhaps, be stretching a point to believe that they did not. Nor does the testimony declare explicitly that the alterations made by Mr. Wilson were adopted into the accepted design, a thing which has been charged before.

THE POSITION OF THE FRESH-AIR INLET.[1]

THE walls of our building, having been made impermeable to air, and all cracks or accidental openings having been carefully closed, our fresh-air supply may be accurately calculated and controlled, and the heating surfaces over which it is conducted may be utilized to the best advantage.

The size of our heating surface having been determined by the amount of fresh air required to be warmed, and this amount again by the maximum number of persons and gas-burners to be supplied, it only remains to fix upon the best point or points in the room for the fresh-air delivery. Here we enter a long-contested battle-field. Whatever means be employed to warm the air before its introduction, it should enter and be distributed in such a way as to serve all without inconveniencing any. As a general rule, and *always* where an open fire-place is used, the entrance should be *at or near the ceiling*, whatever system of heating or cooling the fresh-air supply be adopted, and whether, upon entering, it be cooler or warmer than the air already in the room. If it enter warmer, it will rise at once to the ceiling, even if it be first introduced at the floor, so that there is no advantage, in the way of heating the floor, by having the hot-air registers in or near it. This may be easily verified by burning some damp straw in the fresh-air box or flues of a furnace and observing the course taken by the warm air thus rendered visible, as it issues from a floor register. It will be found to shoot upwards in a round column to the ceiling as represented in Fig. 146, more or

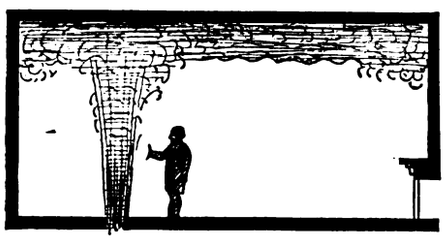

Fig. 146.

less rapidly according as its temperature exceeds more or less that of the surrounding air. Outside of this column the air will be no warmer at or near the floor than if no register there existed, until the heated air at the top descends in regular strata to the bottom. In fact, one of the best places to draw off the colder and fouler air from such a room would be through an opening placed directly by the side of this hot-air supply register in the floor. If, on the contrary, the fresh air introduced be cooler than that already in the room it will, if it enter at the floor, escape at once at the fire-place opening or at any other foul-air exhaust-flue which may be placed near the floor, without rising to the level of the heads of the occupants, and be lost. But if the entering air be cooler than the air of the room it will greatly inconvenience those who may be seated near the inlets, where these inlets are at the bottom of the room, especially in large rooms, as in public halls, school-houses, and theatres; whereas, if the supply registers be at the top and exhaust registers at the bottom, no such inconvenience will be felt. No opening for extracting the products of respiration should be allowed above the level of the heads of the persons occupying the room. If this rule be ignored the fresh air will not reach the occupants, and no ventilation will be for them effected. Fig. 147 shows what would

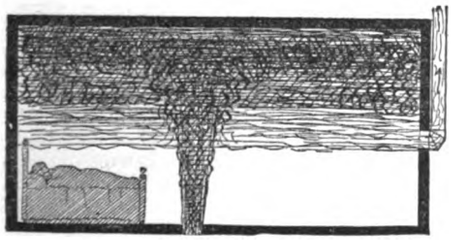

Fig. 147.

be the result in a bedroom where the exhaust register was placed above the head of the sleeper. The warm-air supply register is here represented in the floor. If it were in the ceiling the results would be the same. The hot air first forms itself along the ceiling in an even horizontal stratum, just as oil lies on the surface of a body of a heavier fluid, such as water. As more hot air enters, the first descends and gives place to it. The lower, cooler, and heavier strata fall; they seek their own level just as would strata of light and heavy liquids. Air does not follow so docilely and obligingly the paths laid out for it by the would-be ventilators, when they explain their patent arrangements by little arrows meandering about snake-like in pursuit of a "draught," or heated exhaust flue. It does not "head" directly to the exhaust register even if the so-called "draught" in it be ever so strong. The lower strata only flow out at these exhaust openings just as the lower strata of water in a bucket would flow out of a hole bored in the side near the bottom. We must always bear in mind that it is not the lighter column of air in the chimney *pulling* up the heavier air in the room, but rather the heavy air in the room pushing up the lighter column in the chimney. There is no suction such as the word "draught" would imply, but a simple uplifting, by the cooler masses of air outside of the house and within the room, of the lighter strata or column in the exhaust flue. The word "draught" is a misnomer and is responsible for much of the confusion existing upon the subject. With an exhaust opening placed as shown in Fig. 147, or worse still at the ceiling, where these openings are usually put (though fortunately they are seldom operative on account of the want of motive power), the supply of fresh air might be enormous and yet the sleeper suffer from want of it.

Where a room is heated by a stove and no fresh air is introduced, this stratification of the air is broken up, as shown in Fig. 148, and the motion becomes more complicated. The currents may be illustrated by heating with electricity, or otherwise, a piece of metal at

Fig. 148.

the bottom of a glass box filled with water containing some coloring matter, and throwing the reflection of the water by means of a lens and calcium-light upon a screen.

These all seem like facts simple and reasonable enough. Why then such a diversity of opinion regarding the location of ventilating openings? It is because in ordinary buildings the question of the disposal of the products of respiration is complicated with those of the gas-burners, while the two should be kept entirely distinct, and a separate and opposite system of ventilation provided for each. To carry off the products of gas combustion openings above the head are necessary. When these openings are placed in the ceiling, as is customary in this country, the upper pure and warm strata of air are impoverished by the products of gas combustion, and it is assumed that the only cure is to *draw it all off as fast as it is generated*. The products of respiration do not rise at once to the ceiling, as do those of illumination. The breath is directed downwards by the form of the nostrils and it becomes so quickly mixed with the surrounding air that before it has time to rise again to any considerable height it has attained the general temperature and follows the general movement of the latter, whatever that movement may be. Were the heat and impurities of gas combustion carried off at their source, and not allowed to affect the general atmosphere of the room, our problem would be at once simplified. The fresh, warm air at the top of the room would be kept pure until it descended to the level of the occupants, when it would perform its office and pass off through the exhaust registers below.

ANOTHER LAW-BOOK FOR ARCHITECTS.[1]

A SERIES of papers lately published in the *Builder*, concerning decisions of courts in cases affecting buildings, forms the basis of a book whose value to the profession will be far greater than its diminutive size, the result of extreme condensation, would at first suggest. This little treatise contains, as it says, a digest of all the cases which have yet been decided in regard to the erection of buildings. Using the very judicious system common in legal text-books, principles are briefly stated, followed by references to all the cases bearing on the subject, so that the text-book is at the same time an index; the architect who reads it attentively can in an hour's time obtain a general view of all the legal reefs which beset his path, and if with his eyes thus opened he finds himself at any time drifting toward any particular one, a second reference to the book will direct him to the larger works, reports of trials, for instance, in which he will find all that there is to be known on the doubtful point.

[1] This paper by the writer of the Open Fire-Place articles will be incorporated with those articles in their separate form.

[1] A Digest of Cases relating to the Construction of Buildings, the Liability of Architects, Surveyors, and Builders in Relation thereto, etc. London: Reeves & Turner. 1879.

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For example, the important principle is stated that where there is a clause in a contract agreeing that materials shall become the property of the party of the first part as soon as delivered on the ground, this clause will prevent any creditor of the builder, even the party who furnished him the materials, or the builder's trustees in bankruptcy, from claiming materials so delivered, and four cases bearing upon the subject are cited for the instruction of those who may have occasion to look further into this interesting subject. Some of the points represented as established are important. Under the head of "Duties of Architect," we find, "Any surreptitious dealing between one principal to a contract and the agent of the other principal is a fraud on such principal cognizable by a court of equity, and entitles the first-named principal to obtain full redress for such fraud, or to have the contract rescinded, and to refuse to proceed with it in any shape."

It was proposed not long ago to make by Act of Parliament such "surreptitious dealings" a misdemeanor, to be punished in a criminal action, but this seems not yet to be the law. However, the remedy in equity for such petty breaches of trust would probably be quick and sure, and all good architects would rejoice to see it extensively applied.

Another rule, which will be new to many, is that when work has been inefficiently done, or not executed according to the terms of the contract, the house owner may, when the time for final payment arrives, make a suitable deduction from the payment, and if the building should be so badly done as to be unfit for its purpose, the contractor is not entitled to any remuneration whatever. It would be an interesting question how much a contractor should receive who laid a house-drain, for instance, of broken pipes, without cement in the joints, and then put a wooden floor over it, and completed the house.

Some precedents of pleading for such cases, forms of building leases and other agreements, the schedule of charges of the R. I. B. A., and two good forms of contract make a useful appendix to a useful little work, whose only fault is its brevity. To our mind, its scope might be very much enlarged with advantage. In Messrs. Jenkins and Raymond's excellent little work on building contracts nearly twice as many cases are cited as in the book before us, although the former treats only of a portion of the subject. As these gentlemen well say, in the numerous and complicated relations of architects with persons and corporate bodies, of all kinds, cases arise almost daily where an authority to which they may immediately refer for information as to the proper mode of completing an agreement or meeting some emergency is of great value. It is not that architects are in danger of ever trying to be their own lawyers; on the contrary, as they themselves find their best and most considerate clients to be those who know something of their own profession, so they will be more disposed to defer to competent advice in the important interests which often devolve upon them, and will be able to present their case more intelligently and fully for knowing something of the way in which courts have treated others in similar situations.

PROPORTION AND ORNAMENTATION IN ARICHITECTURE.[1]

Before we pass altogether away from the consideration of the technical rules of architecture, it may be desirable to pause for a short time in order to examine one other point affecting our art, namely, Proportion, — a matter obviously of great importance, and which is not included in any of the principles to which I called attention in my previous lectures.

Now proportion in an abstract sense is one of those things upon which every one feels competent to pronounce an opinion. We know how readily we declare our judgment that anything, from a great building to a teacup, is well proportioned or the reverse. We have, in fact, certain canons of taste acquired intuitively and stored up in our minds which we apply (not always rightly, of course) to this question of proportion. It is not that any particular form is good and another bad in itself, for, under different circumstances, the same form may be both one and the other, but that we have, from associations, brought ourselves to an unexpressed conviction on the subject of proportion which we, or some of us at any rate, are slow to express on any other subjects which we have not specially studied.

The reason of this confidence may, perhaps, be found in the reflection that our ideas of proportion are based on our acquaintance with the human figure. Nature, in that case, teaches us the science of proportion, and we apply her lessons to the artificial productions of art. It is in this way that we find ourselves attributing to the Doric order the masculine attributes of sturdy strength and vigor, while the Corinthian indicates feminine grace and appropriate decoration. In architecture, when proportion is mentioned, it may be considered under two heads: first, as it appears to the instructed, and, secondly, as it appears to the uninstructed, observer. To the first, proportion will mean much more than to the last. It is not sufficient for him that a building should please as a whole. He knows what should be the relative size of every detail, — what ratio the base should bear to the shaft, the shaft to the capital, and so forth. Any departure from recognized rules is to him a solecism and an offence; it is like a false quantity to a scholar, a *lapsus linguæ* to an educated man. The ordinary and not specially instructed observer sees none of these things. It is nothing to him whether a Grecian Doric column be used with a base, or a Corinthian column without one. The relative proportions of mouldings to each other have no significance for him, nor does he appreciate the differences of style which strike at once the more educated critic. Nevertheless, he will tell you whether a building is, in his opinion, well or ill proportioned, and on such a question the popular judgment is seldom wrong. We may conclude, therefore, that there is a science of proportion, and that some perception of this important element of success in architecture is innate in the human mind, just as a sense of harmony may exist without any technical knowledge of music. Proportion thus assumes a position of great importance in architecture, and deserves attentive consideration at our hands.

Many rules have been propounded for determining what is and what is not good proportion; thus it is suggested by Mr. Fergusson that the height of a room should be equal to half its width, plus the square root of its length. And, again, that the best Gothic architects based their proportions on the equilateral triangle. I must confess, however, that these and other similar *dicta* have not carried conviction to my mind, though some merely conventional rules may be found in practice to secure agreeable results. A satisfactory proportion of a room may, for example, be obtained by first deciding the width, then drawing a line from one of the corners, so as to form a triangle, and making the length of the room equal to the line so drawn, being the hypothenuse of such triangle. I do not, however, propose now to discuss the difficult question of proportion, as applied by arbitrary rules to plans of buildings. I rather wish only to point out here, first, that good proportion is a recognized necessity in architecture, and, secondly, that it rests upon certain principles which cannot be departed from with impunity. The eye soon learns to accept such principles, and, as a general rule, any unusual proportion, whether of length, width, or height, is found objectionable. It is impossible, however, for an architect always to proportion his designs according to rule, nor would it be at all desirable that he should do so. Great effects are often produced by genius, notwithstanding the disregard of rules; and in spite of rules which serve to guide ordinary cases, the limits are wide within which freedom of action may be practised. During and after the days of Palladio and Vignola, the proportion of every moulding to be used with the five orders was discussed and settled as if it were a matter of exact science, and as if nothing should be left to the skill and discretion of the archictect in individual cases.

In mediæval days proportion was not subjected to such definite rules, or at least no record of them can be discovered, but it seems clear, from the remarkable similarity of principle which is found in the works of the time, that a science of proportion was recognized and carried out with more or less precision. Thus we find the width of our cathedrals almost always divided into three parts, with a central nave and two aisles, and the walls of the central division composed again of three distinct features, namely, the nave arch, triforium, and the clerestory. Various proportions were given to these parts of the design, but from a comparison of the best specimens, something like the following rule of composition may be deduced: The height of the aisle arch is half the total height of the nave, while the triforium and clerestory occupy the upper division. The latter may then be divided into three parts, one of which is given to the triforium, and two to the clerestory. Not only does this arrangment of parts appear reasonable and pleasing, but it establishes a system of proportion based on the numbers 1, 2, 3; and it has often been observed that a proportion which can be traced to a definite system, so that each part may be a multiple of each other part, is more satisfactory than one which admits of no such simple illustration. In a like manner, observation may show that uneven numbers will please in architecture more than even numbers. Other things being equal, a composition with three or five windows, grouped together, will produce a better effect than one with two or four. A flight of three steps is better than four, and one of five than six. A room will be mere cheerful if it have a central window, than if there is a pier with the same amount of open space arranged in two windows, one on each side of it. In a panel of tracery, or a balustrade, an uneven number of divisions is to be preferred, which will allow the central space of such panel or balustrade to be occupied by a void rather than a solid. It would not be difficult to multiply examples of this class of architectural science which come under the general description of proportion. Experience and habits of close observation, fostered by the practice of taking careful measurements of existing buildings of high merit, will enable the architectural student to analyze this difficult science, and so prepare him to avail himself in his own designs of the experience of others. He may be sure of this, that unless a building be well proportioned, it will fail to please, whatever may be the merits of the detail of its parts. He cannot regulate the actual size of his work, as this must depend on site, cost, and other circumstances beyond his control, but he has the responsibility of so proportioning the parts of his design that difficulties may be conquered and deficiencies supplied. If he be fortunate enough to obtain the element of size by being entrusted with a large building, he must not throw away so great an advantage as has been done at St. Peter's. If, in the contrary case, he has to deal with small dimensions, he must make the most of them by even a more careful application of the science of proportion.

[1] A portion of the fourth and undelivered Royal Academy lecture, prepared by the late Professor Barry.

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We may now proceed to take into consideration the subject of architectural ornament, and, to do so the better, will divide it into two heads, — constructive and decorative, — dealing first with the constructional part of the subject. Architecture as a fine art is essentially a decorative art, for she has to ornament the bare construction of works carried out for utility alone. A builder may erect a house square and comfortable, but it is not a work of architecture. It may be sensible in arrangement, warm, and weather-proof, but it has no beauty, and displays no art. The latter is shown in the application of ornament. Not, be it observed, in the mere addition of carving, color, or whatever may be thought to be ornament, but by giving dignity and beauty to the forms of construction, and by subordinating construction to artistic feeling.

It is important to bear in mind this distinction. Many excellent persons seem to consider that any structure may be made ornamental by plastering it with so-called ornaments, as we cover a Twelfth-cake with sweetmeats. If a railway bridge be pronounced hideous, we are told that it is easy to make it sightly by spending money on bosses, panels, and cast decoration, and sticking all this on the bald nakedness of the original design. No mistake can be greater than this. In architecture, we cannot separate the useful from the beautiful in this manner. In making his design, the architect must ever bear in mind how it is to be carried out, and in arranging his construction, he must remember from the first that it must please the eye as well as satisfy the conditions of stability. If the bridge be ill-proportioned or badly placed, no amount of applied decoration will redeem it from ugliness, or entitle it to be called a work of architectural art. If such a square builder's box as I have just mentioned is to be brought within such a definition by ornament, the ornament must be reasonable, and such as arises naturally from the circumstances of the case. A porch would thus be an ornament in this sense, or a projecting window. Chimneys may be broken into masses of agreeable aspect, or moulded into beautiful forms. The walls may be crowned with cornices, and the lines of floors marked with string-courses, or gables and dormer windows may break a too great plainness of roof. All these things are ornaments if rightly applied, and as such are among the legitimate resources of architecture. In private buildings, any added features, such as porches or bay-windows, will owe their origin to their obvious utility ; and if they are not reasonable, they will not be considered ornamental. For public edifices, dignity and impressiveness are also required, and so may justify the addition of ornamental features, for which usefulness cannot give a complete reason. Porticos, turrets, and spires may come under this definition, and we cannot afford to surrender such important elements of architectural design.

Decoration of necessary construction may also be seen in the contrivances of design which enable the architect to group together in a pleasing form necessary details, such as windows. The mediæval architects were masters in so doing, as we see by tracing their system of fenestration from Norman days to the latest Tudor. The simple lancet thus gave rise to the graceful triplet, and to the famous group of beautiful windows known as the Five Sisters at York. The elaborate tracery windows which were afterwards used were only a development of the system of grouping exemplified by these earlier specimens. We see also in the Italian Gothic palaces of Venice, as the Ça d'Oro, how much effect can be obtained by the simple expedient of grouping the windows together instead of dotting them all over the front with equal intervals between them. Nor were the best Renaissance architects backward in recognizing the merits of this treatment. At the Farnese Palace at Rome the central loggie, though open to grave objections of detail, redeem the façade from monotony; and at the Vendramini and Camerlinghi Palaces at Venice the windows are so grouped as to be very pleasing. In modern architecture we have an instance at our doors of the satisfactory result of window grouping in the Travellers' Club-House in Pall Mall. In this example the contrast may be clearly seen of the two systems of uniform regularity and of partial grouping by comparing the elevation towards Pall Mall and that which faces the gardens at the back of the club-house. The former, while well proportioned and correct, has never roused enthusiasm, while the latter has ever been regarded with pleasure, and referred to as a success. Of the five windows of which the dimensions of the front allowed, three are gathered together so as to form a central group, while the other two windows are treated singly and placed about half-way between the centre triplet and the angles of the building. The centre assumes thereby an air of dignity combined with elegance, and gives a concentration of constructional decoration on which the eye rests with all the more pleasure from the circumstance that by grouping together three out of the five windows a greater plain surface of wall is obtained on each side of the central composition, the effect of which is consequently materially enhanced by contrast. Further examples of results equally satisfactory might be quoted from Transitional or Elizabethan buildings, such as Longleat House, in Wiltshire, where, in spite of great regularity of plan, advantage is taken of the internal distribution of the rooms to obtain variety by duplicating windows, and gathering them into bays. Enough, however, has probably been said on this illustration of the nature of architectural ornament constructively used. The use of columns instead of plain piers is another instance of decorated construction, the round or moulded form being more graceful than a simple rectangle, while being at the same time quite as useful. A column, indeed, is even more truly constructional in supporting a superincumbent weight than a pier of square section or plan; for in case of any partial strain or settlement, the angles of the pier are the first parts to show signs of weakness and to disintegrate. The column, properly used, is, therefore, in such cases, an object of perfect utility as well as of beauty. How great that beauty may be made by the use of beautiful materials, delicate decoration, moulding, and carving, we all know from many a noble example. The column being constructional, its parts are so likewise. The moulded and projecting bases carry down the pressure to the ground, and cover an extended bearing surface, while above, the capital, either moulded or carved, spreads out to receive the lintel or the arch which requires support. Brackets are, again, constructional as well as decorative, serving, as they frequently do, as springers for vaults or supports for roof-beams or principals. An extended use of such features has become common in much of our modern revived architecture, and as there may be some temptation to exaggerate its use from the convenience it affords, it may be as well to suggest a word of caution on the subject. A corbel which is placed high up and near the roof, and over the centre of an arch, to carry the springing of a vault, has an obvious fitness, for no other detail would serve the required purpose as well. It is different, however, when we find a chancel-archway made of the greatest possible width at the floor level, while above, heavy groups of mouldings form a ponderous arch, resting at the springing on corbels of great projection, while, below them, we have, possibly, diminutive shafts, resting in their turn on smaller corbels. In such a case the corbel has not the obvious justification which applies to the other position just described, as it appears in the place of mouldings or columns which would discharge the duty allotted to it in a manner more truly constructional and satisfactory. The mediæval architects made their corbels, as indeed they did all their construction, beautiful, as we may see, for instance, at Ely; but, to be beautiful, architecturally, there must be a good reason for their use. They will often be admissible when so placed that they cannot easily be seen in profile when they will appear to less advantage if brought into great prominence, as in the position I have mentioned. They serve, in any case, to further illustrate the constructive element of architectural ornament.

THE ILLUSTRATIONS.

NEW COLLEGE BUILDING AT GEORGETOWN, D. C. MESSRS. SMITHMEYER & PELZ, ARCHITECTS.

GEORGETOWN College, founded in 1788, is located west of the city, on a hill 150 feet above the Potomac River. Formerly the college consisted of a dozen buildings, built irregularly, at different times, without general plan. The hill-top was occupied by four larger buildings, — three on the south side, and one, about 156 feet off, on the north side, leaving an open court east and westward. It fell to the architects to build on the east side a connection between the north and south buildings, which should become the principal building of the college.

The walls are built solidly of a blue gneiss rock from the upper Potomac, with bluish gray Ohio freestone and North-river blue stone for the cut-work. The court-front is of front-brick (not pressed), to correspond with the adjoining old buildings, with freestone sills, mullions, weatherings, etc. The ceilings in the principal rooms and halls will be finished in wood. The walls of the corridors adjacent to the class-rooms and those of the staircases will be left in brick, which are laid with struck joints. All corbels, columns, and a great part of the sills of the interior are of freestone, built in place. All the constructive wood-work in the interior is of Southern pine and oak, planed, chamfered, and carved, and built in place. All cast and wrought iron work exposed to the weather is galvanized. The metal work of the roofs and towers is made of tinned copper, the gutters and conductors of plain copper, and the ridges are covered with lead.

The extreme length of the building is 312 feet. The central tower is 200 feet high, and will be used as a ventilator and will be provided with a clock. The vacuum system will be used. The heating will be done by warm water in coils which are placed in the window recesses, where they draw the fresh air from the outside through the hollow iron sills of the window-frames. The finished floors will be laid on sleepers which are placed upon the rough floors, and bedded in deafening mortar.

DESIGN FOR A CATHEDRAL AT DEMERARA, BRITISH GUIANA, SOUTH AMERICA. MR. BRUCE PRICE, ARCHITECT, NEW YORK, N. Y.

BUNGALOW AT MONUMENT BEACH, MASS. MR. W. G. PRESTON, ARCHITECT, BOSTON.

OLD TILES.

IN the old colonial towns of New England the eager searchers after antique furniture and china have met with good returns, and many an old mahogany chair and claw-foot table, well-turned brass andirons, and equally handsome fenders, have been brought from garrets, where they had led a useless life for generations. But the demand has increased so rapidly, and the search has been so persistent, that now it is difficult to find a house of the last century that has not been ransacked from garret to cellar. Every village and hamlet has been explored, and even the isolated farm-houses on

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Block Island have been subjected to the scrutiny of the bric à-brac collector; till now, if anything really worth having is found, it is hardly possible to get it at a reasonable price. To-day one must pay far more for a cracked dish than it was worth when new a hundred years ago.

Curious and beautiful are the inferiors of many of these old houses, and it is not surprising that the cultivated taste of to-day takes delight in copying many of their details — in reproducing old colonial mantel-pieces, corner cupboards, spiral balusters, and the free use of tiles.

It was a very common thing, a century or more ago, to introduce tiles everywhere in the better class of dwellings, particularly around the fireplaces, and in the skirting of halls and living-rooms. In Newport there were many such examples. The Redwood house was ornamented in this way, and to a greater extent than in many other instances. The tiles, either pink or blue on a white ground, were carried around nearly all the rooms, in place of a base or mop-board. Many of these tiles have been carried away, others have been destroyed in the attempt to get them out, and not a few have had nails driven through them. In the old house that was General Prescott's headquarters, on the corner of Spring and Pelham Streets, and in the old Seixas house, on Washington Square, once the residence of the Jewish banker of that name, and after that the property of Commodore O. H. Perry, there are tiles about the fireplaces that were painted over long ago by some vandal, who would have whitewashed a fresco by a Guido or a Raphael.

In many instances these old tiles have been preserved as heir-looms. Your correspondent has a set that has been handed down through four generations — tiles that are vastly superior to the old Dutch tiles; for they were among the first that were imported after the discovery of a process by which designs could be transferred from copper-plate to an unglazed surface. Two of these tiles are caricatures of cooks — one French and the other English: John Bull, with his sirloin, fat capon, and tun of beer; and his *vis-à-vis* engaged in skinning a cat, with a bunch of frogs, a string of onions, and a pump for the details of the picture.

Collectors of old tiles have endeavored to preserve the history of those in their possession. Mr. Robert S. Barker has specimens from the two Wanton houses, and from the Redwood house. The latter are of the variety known as "basket tiles," which are now rarely seen. They take their name from a basket of flowers, in colors, in the centre of each tile. Those from the Governor Wanton house are blue and white. They are above an average of the best make of their kind, and come under the head of bat printing.

Tiles are distinguished as "press printing" and "bat printing," the former being much the oldest. In press printing the design was put directly upon the bisque, which accounts for the crude manner in which they are drawn; but in 1767 Sadler, a potter, discovered that designs printed from copper plate could be transferred to the face of a tile, which was then glazed in the usual way. This process is known as "bat printing," and it at once did away with the old method of decorating. To one skilled in this matter it is easy to distinguish between the two by passing the hand over a tile; but it is not necessary to resort to this, for a very slight examination brings to light the superior finish of a Sadler.

There are tiles in two or more colors besides the basket tiles. The designs are transfers, but they are not as good as Sadler's, though in his manner. Over the transfer, colors have been washed with about as much skill as a boy displays who has just come into the possession of a color-box and brushes. But they are interesting, in that they form a class by themselves.

The best tiles, as a general thing, are of one color — black, blue, or pencil, on a white ground. Press tiles usually give us scenes from the Scriptures, or Æsop's Fables, and curious is the treatment of these subjects. The execution is feeble, even rude; but the manner in which the story is told arrests attention. In one, a group of men and angels are mixed up with locusts and scorpions, of an extraordinary size and in the most extravagant positions; but for a text in one corner the design, the opening of the bottomless pit, would be unintelligible. In the Temptation on the Mount, Satan resembles an ape, and in the Betrayal the artist has been minute to a degree that leaves nothing wanting. Judas is in the act of kissing the Saviour, and a soldier, with out-stretched arms, is pressing forward; while Peter has Malchus down, and is cutting off his ear with a sabre. Malchus, judging from his costume, must have been the high priest's jester. In the Ascent of Elijah, the prophet seems to have had as much trouble as did Phaeton in the management of his steeds. The parable of the mote and the beam was a favorite subject with the designers. Curious, indeed, is the minuteness with which the mote is given, while the beam, a huge bit of timber, tells its own story. But the crowning effort of the artist is seen in "Lot's wife turned into a pillar of salt" — a half-nude figure, on a pedestal in an open plain, having for a background Sodom and Gomorrah, sending up great volumes of smoke that remind one of Manchester and Pittsburgh, which cities, I hope, will take no offence at any allusion to them in this connection.

On tiles of a later date than those made by Sadler one may often meet with designs as good as anything found on old Liverpool ware. In a majority of cases they were made at some factory in England, but the earlier varieties were brought from Holland. Large quantities were shipped to this country, and from the sea-port towns of New England they were not only sent inland, but also to the West Indies, where it is still a common thing to see them. There was a large trade between Amsterdam and Newport, on the one hand, and Newport and the West Indies on the other: and rarely did a vessel clear for the latter ports without taking out an invoice of Dutch goods, which had been received in exchange for American products.

The early importation of glazed ware was not confined to tiles, but it embraced all the varieties of delft, and here and there one comes upon a specimen in regard to the origin of which there can be no question. Some of the most interesting are in the form of gally-pots, used by druggists. In Taylor's store, on Thames Street, there are a number of such pots, known to have belonged to Dr. William Hunter, who came to America in 1752 and settled in Newport.

CHAMPLIN.

CORRESPONDENCE.

BRICK BUILDINGS.

PARIS.

NAPOLEON was wont to boast that he had found Paris of brick and would leave it of marble. He did not say whether brick stood for republican ideas, and marble for the Empire; but certainly since the war, and especially during the past few years, Paris architects have begun to show a liking for brick buildings, and for private dwellings brick with stone finish and a liberal sprinkling of bright-colored tiles seems to be quite the fashion. This is true in the quarters where English and American residents abound. The French affect to quietly snub their neighbors across the Channel in art matters, yet they do not object to receiving an idea from them occasionally.

The Place Malesherbes is formed by the the junction of the Boulevard of the same name with the Avenue de Villiers. In this vicinity are several examples of brick construction which are well worth study. The large École Monge is one of these. Stone is used for the springing-blocks of arches and window-sills only. The vertical divisions and window arches are of brick of a reddish brown color, giving a dark chocolate effect at a distance. Between the windows are panels of a very rough brown stucco, with borders of the same material, but smooth and white. The flush bands and string-courses are of brown brick, set on edge or slightly corbelled out. Over each window is a diamond-shaped plaque of terra-cotta, with figures in two shades of light brown. The cornice is formed by ordinary yellow brick, with deep red and a few black brick forming geometrical patterns. The roof is of ordinary red tile, projecting very boldly over the wall, with no facia mouldings, after the manner of the Florentine villas. The colors of the different materials harmonize very nicely, and quite redeem the building from being plain or commonplace, though there is not a particle of carved work about it.

Diagonally opposite this building are several artists' studios, one of which is quite neatly designed. It has but two stories. The *rez-de-chaussée* is of stone, heavily rusticated, with a narrow door in the centre. The large studio window occupies nearly the whole width of the floor above, the walls being of red brick with stone finish very boldly used. An adaptation of a Roman Doric entablature serves as a cornice, above which shows the red tile roof. The details are simple, but carefully chosen, and the effect is quite elegant.

No. 2, Place Malesherbes, is a house in which stone is used only for basement course and sills, but the brick is used in such a quiet, sensible manner, that the result is very attractive. Ordinary dull red brick is used for wall surfaces, while the corner pilasters, belt-courses, and ornamental parts are of very light gray. The cornice is slightly corbelled out and a rather plain roof and belvedere appear above. Instead of the ordinary wooden rolling shutters, the windows are provided with blinds of straw matting, striped vertically with deep red and yellow, which roll up into a hood over the door and look much better than the ugly *jalousies* which so often disfigure Paris buildings. On the adjoining Rue Legendre is one of the best examples of colored brick and stone work that the writer has found in Paris. Judging by the array of drawing boards that can be seen through one of the basement windows, it is the residence of an architect. The house, be it remarked, is quite American in general appearance. There is a basement story of light bluish-gray stone, the joints strongly marked. The main floor is of light yellow sandstone in courses about five inches high. The entrance is in the centre of the façade, and is reached by a flight of eight steps. One window is on either side, filled with small panes of glass. The same arrangement is used in the second story, but the central window over the doorway is in three compartments and filled with stained glass. The wood-work about windows and door is painted a dark, rich brown, contrasting finely with the deep red curtains which show from within. Over the door-way is an ordinary classic hood supported by consoles. A wide flush band runs from the plain window caps to the top of the door-way, carved with a graceful Greek fret pattern. There is no other decoration about the lower story, except that above each window is carved a single lily in bold relief on the wall. The second story is of stone with intermediate courses of light yellow brick and stone caps and flush bands as below, but plainer. Above this is a high band of light yellow brick, with diagonal patterns of deep red, while over each window is set a medallion head, painted on terra-cotta upon a strong cadmium ground. The attic story is quite low, the wall being of courses of stone alternating with narrow lines of yellow brick. The cornice is of plain stone, with brackets close together

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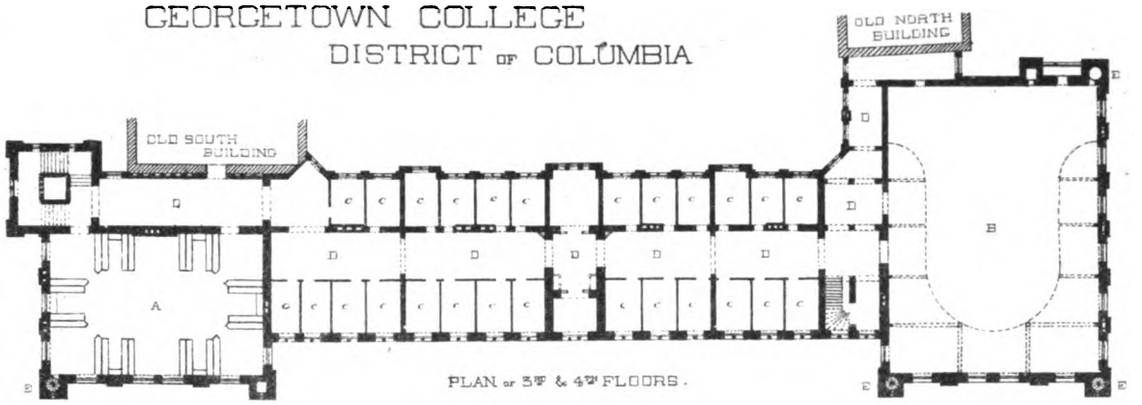
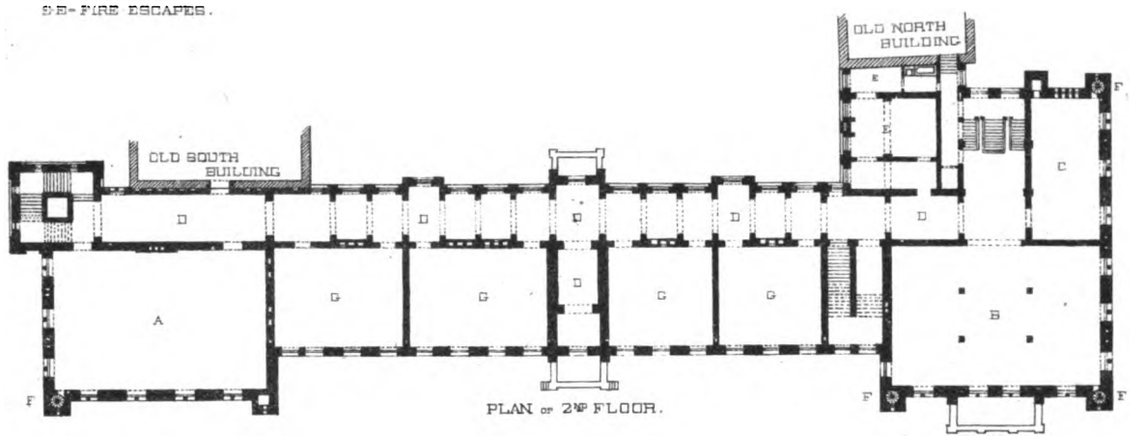
GEORGETOWN COLLEGE
DISTRICT OF COLUMBIA



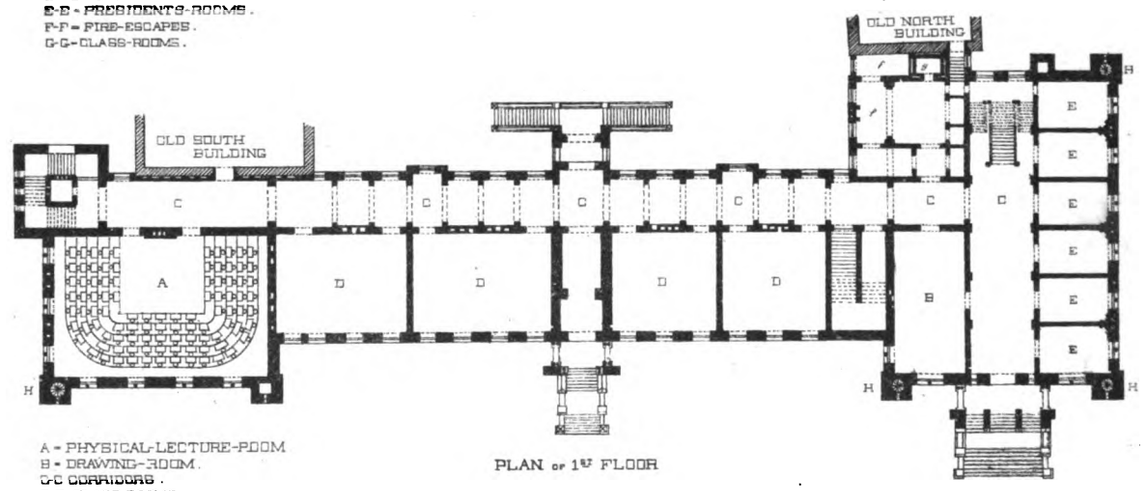
PLAN OF 3RD & 4TH FLOORS.

A - LIBRARY
B - AULA-MAXIMA } 32 FEET HIGH
C-C - STUDENTS-ROOMS.
D-D - CORRIDORS.
E-E - FIRE ESCAPES.



PLAN OF 2ND FLOOR.

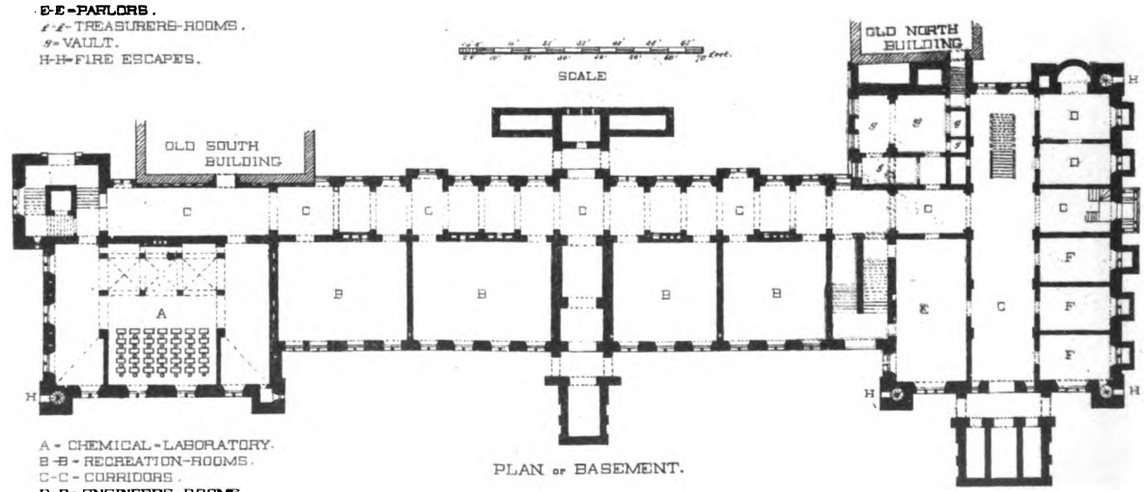
A - UPPER PART OF PHYSICAL-LECTURE-ROOM.
B - MUSEUM.
C - DEBATING-ROOM.
D - CORRIDORS.
E-E - PRESIDENTS-ROOMS.
F-F - FIRE-ESCAPES.
G-G - CLASS-ROOMS.



PLAN OF 1ST FLOOR

A - PHYSICAL-LECTURE-ROOM
B - DRAWING-ROOM.
C-C CORRIDORS.
D-D - CLASS-ROOMS.
E-E - PARLORS.
f-f - TREASURERS-ROOMS.
g - VAULT.
H-H - FIRE ESCAPES.

SCALE



PLAN OF BASEMENT.

A - CHEMICAL-LABORATORY.
B-B - RECREATION-ROOMS.
C-C - CORRIDORS.
D-D - ENGINEERS-ROOMS.
E - EXPRESS-ROOM.
F-F - STORE-ROOMS.
W-W - LINEN-ROOMS
H-H - FIRE-ESCAPES.

SMITHMEYER & PELZ
ARCHITECTS
WASHINGTON D.C.

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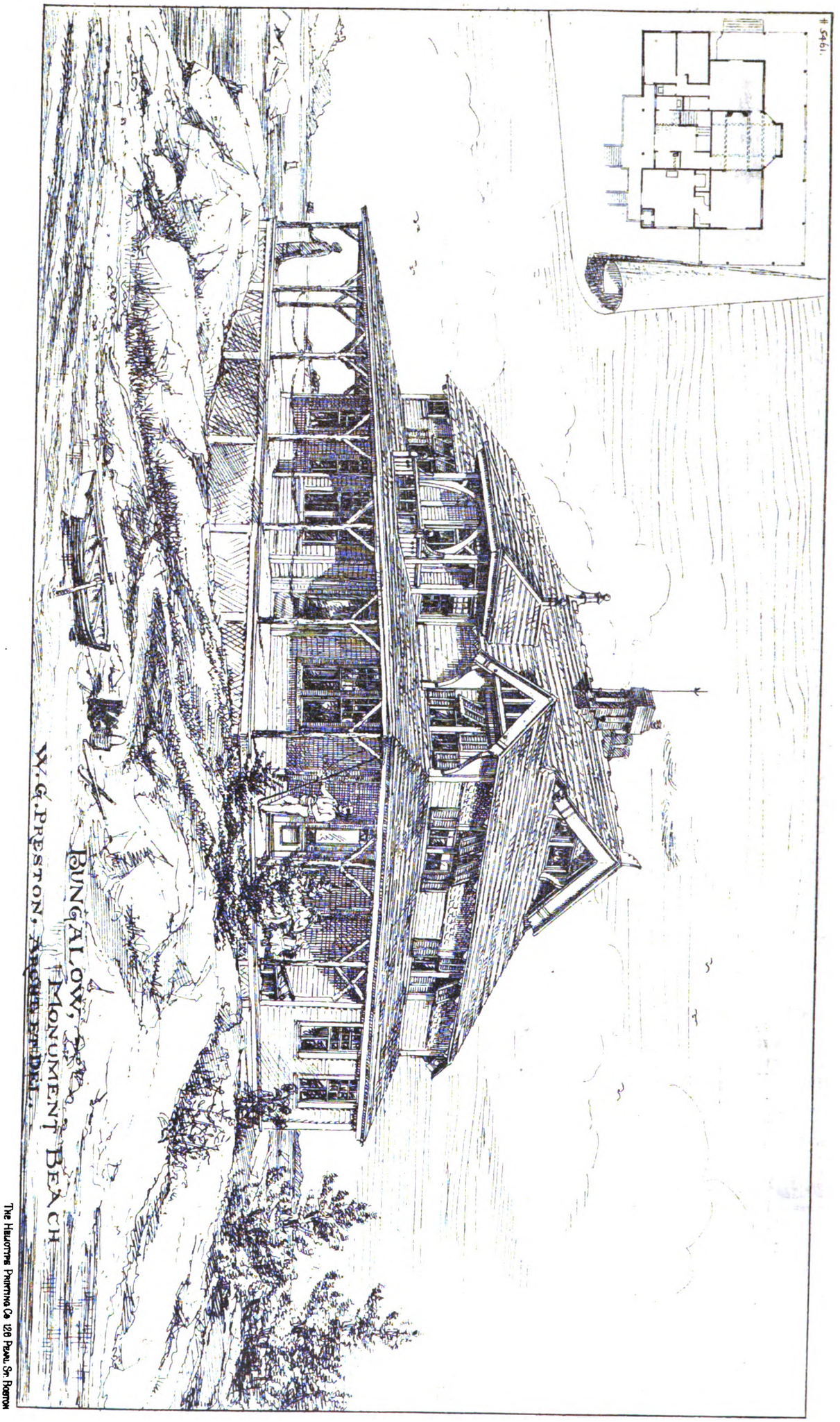

BUNGALOW, MONUMENT BEACH.

W. G. PRESTON, ARCHITECT DEL.

THE HELIOTYPE PRINTING CO. 128 PEARL ST. BOSTON

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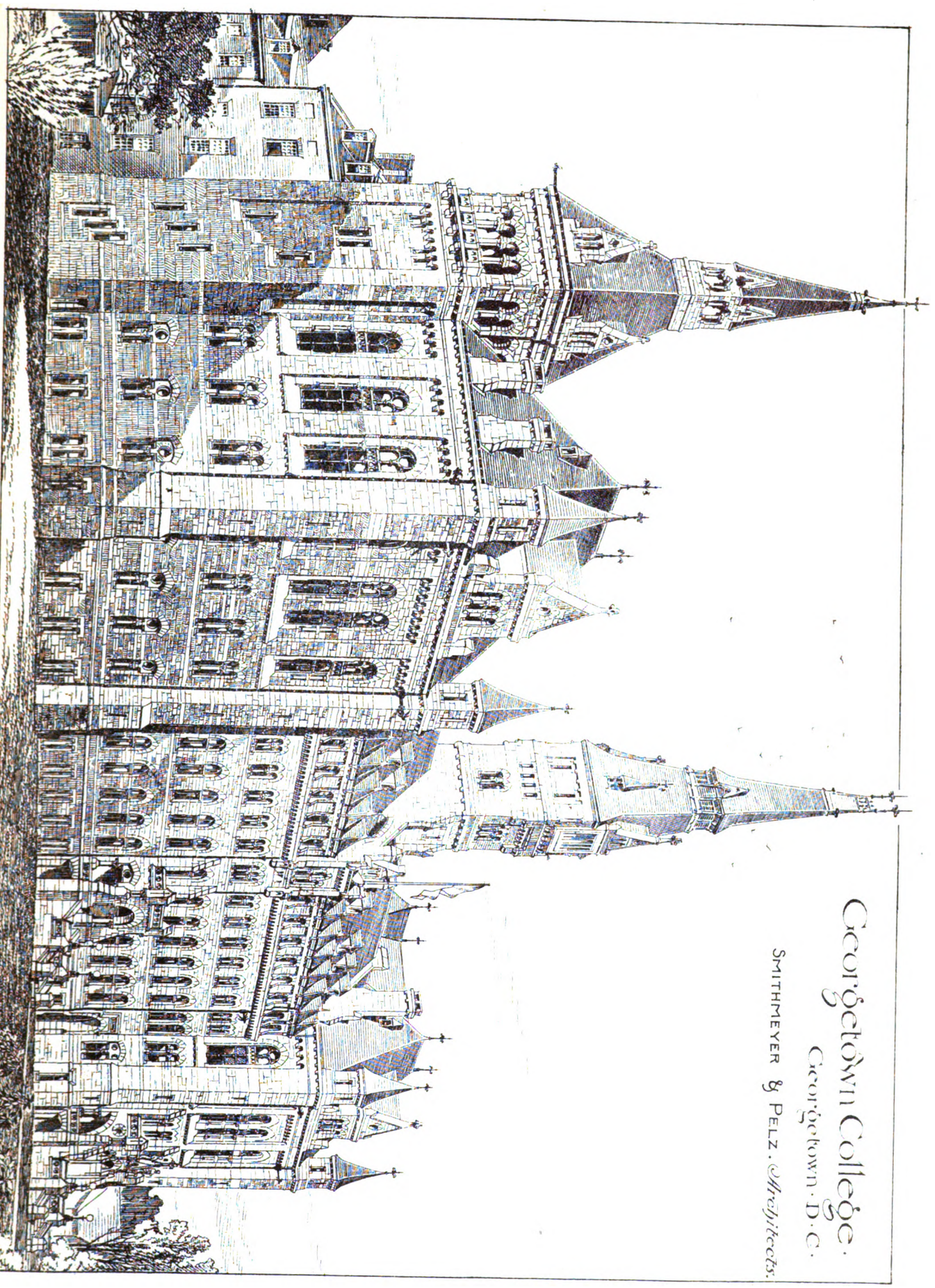

Georgetown College.
Georgetown. D. C.
SMITHMEYER & PELZ. Architects.

THE HELIOTYPE PRINTING CO. 239 Franklin St. BOSTON

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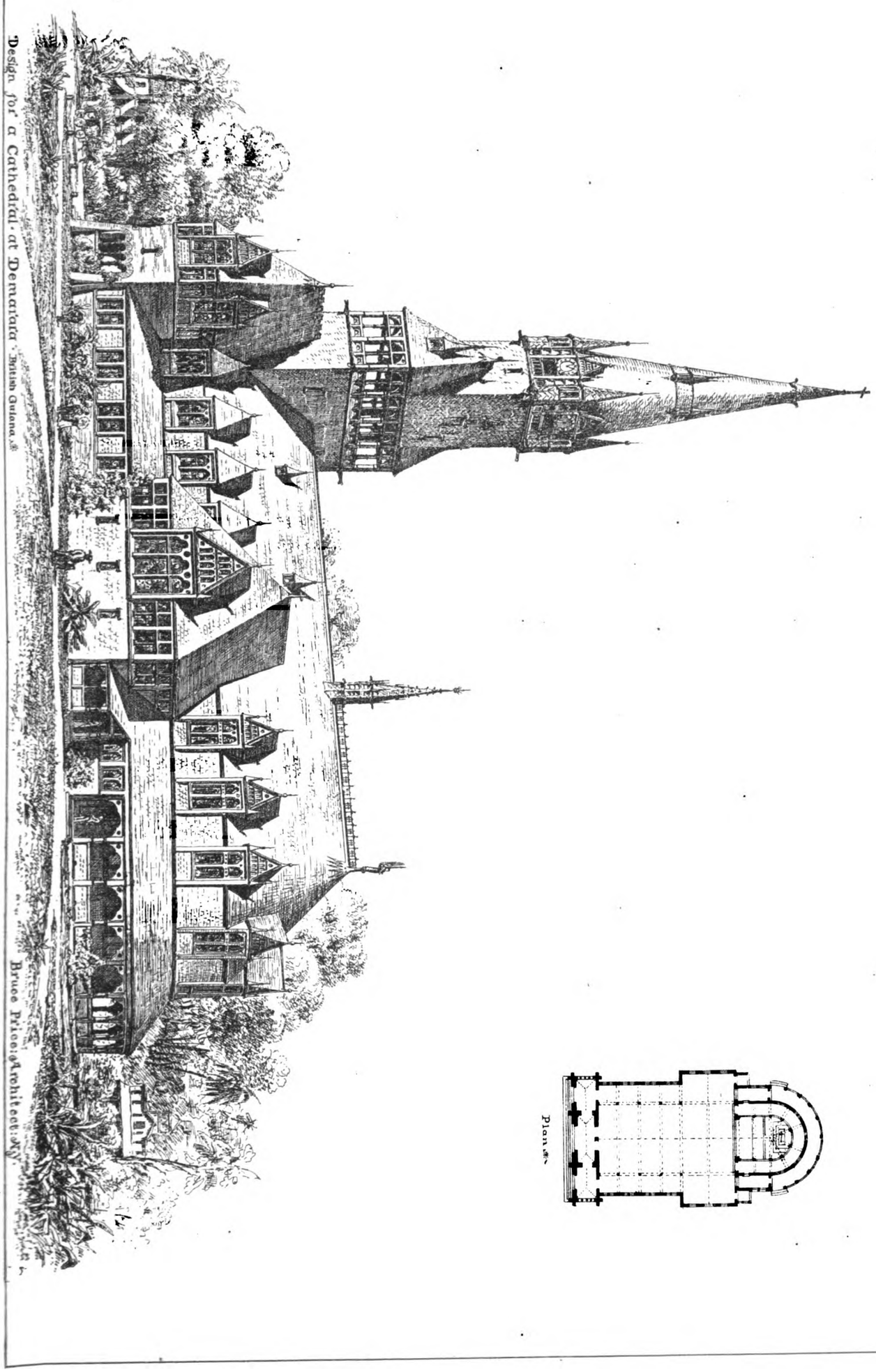
Design for a Cathedral at Demarara, British Guiana.

Bruce Price, Architect, N.Y.



Plan.

The Heliotype Printing Co. 120 Pearl St. Boston

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adorned with small plaques of bright yellow, marked with deep purple figures. A red terra-cotta *chéneau* of very neat design forms a broken sky-line. The whole appearance of the building is very good, and quite artistic, the colors giving a very soft, harmonious general effect, and the few carved ornaments being well chosen, while the patches of bright color given by the terra-cotta plaques add quite a sparkle to the design.

The vicinity of the Place de Bitche, south of the Arc de Triomphe, is another locality which seems to be favorable to the growth of brick structures, one street being lined with them on both sides for quite a distance. This would be natural enough in England or America; but in Paris, where the best of building stone is so abundant and cheap, it indicates something else than mere necessity in the choice of materials. At the corner of the Place and the Rue de Galilée, is a bold attempt at using red brick and stone, only in part successful, the harmony between the masses being poorly established, though the general effect from a distance is not bad. One noticeable feature is that all the windows are filled with glass of a very decided green tinge. In striking contrast is a house on an adjoining street, strongly Gothic in feeling, showing a high roof with tall stone dormers and a bold gable on the right filled with oaken open-timbered work, presenting quite a good effect. The windows are double, square headed, with heavy transom bars, and the mouldings at the sides are carried up above to form a pointed arch. They are filled with small rectangular lights of green, white, and clear glass set in leads. The wall-space between the windows is covered with rough brown stucco, contrasting well with the smooth yellow stone. This is really the rear of the house, the entrance being on another street; but it is much more interesting from this side. It lies back a little from the street and has a cozy, home-like look about it that finds a soft spot in the heart of an Anglo-Saxon. Modern French architecture will not always satisfy, and it does one good to come upon a bit of individuality like this.

Individuality abounds in this street. The appearance of the adjoining house is heightened wonderfully by the use of a little color. It is an ordinary three-story French *hôtel*, with no *rez-de-chaussée*. The lower stories are entirely of stone, with marked horizontal joints. Over the heads of the upper windows are set some pieces of bright faïence, in green, cadmium, and brown, — the green predominating, — which harmonize fairly. The walls of the attic story are of deep courses of strong yellow brick, alternating with narrow courses of strong red. A capping course between the windows is formed by broad bands of stone in which are set tiles in the same colors used below, but with brown predominating. The *chéneau* is of red terra-cotta of simple design. The effect of the colors is quite pleasing and harmonious.

Farther down the same street is a private residence quite happily designed in Gothic; not such Gothic, however, as some French architects misuse, nor such severely correct work as the feeble imitators of Viollet-le-Duc try to produce, but a free and very reasonable adaptation of Gothic ideas to the wants of a modern habitation, bringing in the effect of color united to carefully studied details and good workmanship. Most of the wall-surface is of stone, but a line of color is introduced under the lower string-course by using red and yellow brick set on end upon a course of dark chocolate-colored bricks. The arch of the low entrance door-way is of deep red brick, with stone key-stone and skew-backs. Between the windows of the upper stories, the walls show yellow and pale red brick. Above the lower windows is a band of strongly colored tiles in yellow, brown, white, and Antwerp blue, blue predominating. Under the cornice is another line of color, — red, yellow, and black brickwork. On the right, the façade shoots up above the cornice into a high gable with heavy coping stones, the tympanum being filled with yellow brick and single plaques of pale blue terra-cotta set into the stone under the apex and at the springings of the gable. The general design is a very satisfactory one and shows much thought.

On a street running parallel to the last is another building worthy of attention. The basement is of regular blocks of yellow, spongy-looking stone, with white joints. On the right is a rectangular red brick tower with corbelled stone cornice, capped by a pyramidal roof and neatly designed finial. Small windows filled with diamond-shaped panes and a little stained glass follow the line of the stairs, while the rest of the front is taken up by a large studio window, the walls being of yellow brick. Over each window is set a frieze band of faïence with arabesques in shades of brown and white on an intense ultramarine ground. These set off the building very well, and give it quite an individual character.

With one or two exceptions, all of these buildings have been built within the past few years, and the best are but just completed. They show a move in the right direction and are full of ideas for those interested in color decoration as used externally upon edifices.

C. H. B.

PUBLIC MONUMENTS IN ITALY AND THE UNITED STATES.

IT is instructive to put in contrast the different ways of erecting national monuments as practised in Italy and America, with especial reference to those now begun or proposed to the great founders of the national unity of each country — Washington and Victor Emmanuel. The feeling and intention which give rise to each are identical, but the modes of executing vary as widely as the distance between the art-experience of the one land and the inexperience of the other. We seize the idea enthusiastically, make it popular by means of the press, obtain a crude, hastily-conceived design from some incompetent source, praise it in the papers, and call on the public, not to criticise, but to subscribe for it, and the Government to adopt it — the whole inception and execution being the immature fruit of a few minds well-intentioned but uncultured in this particular direction, although, perhaps, wise in every other. The beginning and preparation of so important an enterprise being thus inadequate to its end and purpose, it is not surprising that after its first impulsive start, the monument lags in construction, dissatisfaction is aroused with its design, and lastly begins the criticism which should have been sounded to its utmost depths before a single dollar had been expended or a stone laid. Thus has it happened with our great national monument, begun chiefly on the idea of raising the highest shaft in the world to our greatest citizen, as indicative of his moral and civil height above all other men in our own eyes. The result has been so towering a blunder as to both design and execution that the country is greatly exercised as to what to do with it, whether to pull it down, disguise it under some other construction, or let it go up as begun, shortened somewhat of its height as first contemplated. We have got a big, disagreeable blunder on our hands, instead of the noblest monument of the world, as was desired, simply because we did not look before we leaped, to use the common expression.

Now there comes forward a host of architectural projects and prescriptions to mend matters and cure our monumental invalid — in fine, to put him fairly on his legs for a fresh start. But the people at large are weary both of looking at the ungainly mass of stone that thus far represents the primitive idea and of hearing about it at all; for it is a confessed mortification and failure. So far from glorifying Washington, it has rather the contrary effect. The virgin bloom of the genuinely spontaneous idea born in the heart of the nation has passed away, at least for this generation. If completed at all, the monument has to depend on a sense of partriotic duty and the pride of not abandoning a nation's project. It has become a question of the will instead of the affections. And this results from beginning at the wrong end. Those who are conscious of this unwelcome fact are now striving to remedy it, as far as can be done artistically, by bringing forward a variety of designs for its completion, to be sanctioned by the opinion of experts and the good sense of the people. In the main they are very crude and hastily considered, some being borrowed from ill-selected and put together Old World forms, while others are the offspring of an ardent struggle for fresh creations born of New World ambitions, frequently quaint and inevitably semi-barbarous, but more or less original, *i. e.*, without precedent in architecture. These attempts show a healthy current of invention setting in the right direction, and augur well for future deliberation and sagacious decision before beginning any new enterprise of a similar character. Indeed, this costly mistake has been a useful lesson. In our coming adventures of this sort we shall probably follow the example of Italy, and look before we leap.

Let us see what Italy does on similar occasions. She is now about erecting a monument to Victor Emmanuel at Rome, to cost 9,000,000 francs. First, and very properly, she raises the money by subscription, the Government guaranteeing to make up this sum if the gifts of the people should fall short. Secondly, she invites all the world to compete for the designs, without any limitations as to character and invention and form, provided it expresses the nation's feelings toward its patriotic, gallant, and honest King, and does not exceed in estimates the sum allotted, which is quite sufficient to erect a monument worthy even of the city of the Cæsars, and the time of Augustus. Thirdly, there are to be three munificent premiums of 50,000, 30,000, and 20,000 francs awarded to the authors of the best three designs. This is tempting enough, I should think, to excite the ambition of some of our American artists to bear away at least one of these prizes in honor of the New World genius. Fourthly, and most wisely, the jury that decides is to be composed of delegates of the Government, representatives of the art institutions of Europe (not Italy alone), and of the competing artists themselves, who will thus have a voice in the decision. No better plan for obtaining impartial authoritative decisions in so complicated and important a matter could be devised. Ignorance, jobbery, and self-conceit are eliminated as far as can be, and the money provided in the outset, so that if a monument creditable to Italy is not the result, it must be due to the inadequacy of the whole world's talent in this line at this time, not Italy's only. — *James Jackson Jarves in the New York Times.*

LUMINOUS PAINT.

ATTENTION has been recently attracted to the luminous paint which was patented in 1877 by the late Mr. W. H. Balmain, and which has been lately employed for rendering clock-dials self-luminous in the darkness. The present invention is the outcome of the life-study of Mr. Balmain, who, unfortunately, has not lived to see his discovery brought into general use. Possessed of ample means, it appears that he was in no hurry to make his process known, and as a matter of fact, after he had brought it to such perfection as justified him in patenting it, little if any effort was made to introduce

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the paint. Although the invention is a patent, the actual process by which the paint is prepared remains a secret, though other inventors have introduced a compound by which the clock-dials are painted, and for the license to use which they pay a royalty to the representatives of Mr. Balmain. The luminous paint is to a certain extent based on what is known as Canton's phosphorus, a sulphide of calcium, which has the property of phosphorescing in the dark; but the modern compound is made principally from that cheap substance chalk, and, if we may judge from the specimens we have seen, is a long way in advance of any of the phosphorescing powders known in the laboratory of the chemist. Messrs. Ihlee & Horne, of 31 Aldermanbury, E.C., are the agents of the late Mr. Balmain, and have devoted considerable time to devising methods of practically utilizing the paint, although until a syndicate is formed (in consequence of the death of the inventor) the paint will not, we presume, be brought into the open market. That, however, will shortly be done, and meantime the paint is being experimented with in various ways. It is in use on more than one man-of-war for lighting up magazines and dark passages, and one of the London Dock Companies is about to introduce it into its spirit and wine vaults. The compound is made into a paint by the addition of a varnish such as copal, and is then ready for coating the surface it is desired to render luminous, or the powder may be dusted upon a previously-varnished surface. The powder may be also mixed with substances employed in forming solid objects, such as cellulose, papier-maché, artificial ivory, and other similarly-manufactured materials, which are capable of being worked into designs suitable for various purposes of decoration and ornamentation; and they can also be mixed with ether and collodion, and rolled into sheets for cutting up. Mixed with stearine, paraffin, glue, or the water-glasses, the phosphorescent powders may be used for many purposes, and can be combined with glass itself, and worked up into the various forms which that substance is capable of taking.

Painted on cardboard about 18 in. by 10 in., and framed, it forms the Aladdin's lamp, supplied to H. M. S. Northampton, by Messrs. Ihlee & Horne. Painted on glass through stencil-plates, it is used for illuminated numbers to house-doors, for notices of apartments to let, and it can of course be employed for the name-plates of streets, for use in coal-mines, and for warning-boards in all dark passages where it is not desirable to introduce a gas-jet. Match-boxes are coated with it, and their position rendered visible in the darkest room; while photographs can be supplied with a luminous background. For railway-carriages which, having to pass through a tunnel or two, are necessarily furnished with lamps during the whole journey, the luminous paint will yield all the light that is needed. Experiments are being made to ascertain the effects produced by different grounds and vehicles upon the powder, and these necessarily occupy considerable time; but sufficient has already been done to disclose the fact that the luminous paint has a wide field of usefulness open to it. Sheets of cardboard placed in a window and exposed to the daylight will absorb sufficient to give a pleasantly luminous effect for five or six or more hours, while half a minute's exposure to such a light as that of burning magnesium will charge them to saturation. When produced on a manufacturing scale the paint will be comparatively cheap, and will no doubt have an extensive sale, for, although many uses have been already found for it, they are only a percentage of the possible number. — *The Building News.*

BREATHING HOLE CAVE.

A party of coal miners have recently been examining a cave in Venango County, Pa., which has long been known to exist, and was called the "breathing hole," from a warm air being constantly emitted from the opening in the ground. After descending an incline for about two hundred feet their way was blocked by an accumulation of boulders thrown down from above. On removing these the passage was continued, but raised abruptly about fourteen feet, opening into a long irregular room fifty feet wide and more than one hundred and fifty feet long. Countless stalagmitic formations of every imaginable shape and size were scattered about the floor of the cavern, the roof and sides being limestone. The most wonderful thing was the finding of bituminous coal on one side of the cavern, which had been brought there from another section of the cave. Coal ashes, or burnt clay, were also found. Another passage was found in which there was an abrupt descent of about a dozen feet. Passing down, they found themselves in another immense room, where more coal was found. Another split in the rock, and a passage led to a room about forty yards long, and the explorers found themselves on the edge of a precipice. Descending, they entered a long narrow tunnel, apparently without end either way. The bottom was covered with a soft sticky mud, but coal cropped out along the sides of this tunnel; and it became evident that this was an actual coal mine that had been worked, and the perpendicular sides, which were gray with age, left standing. The vein was eight feet three inches in thickness, and as the prospectors deemed it valuable, they secured a lease of three hundred acres, and commenced operations; but it was soon discovered that the whole side of the mountain at some remote period, owing to a convulsion of nature, had apparently slipped off and sunk downward, and thus had sealed up and concealed the seam of coal. Subsequent explorers found, upon removing the mud and loose stones near where the explorers first entered, a flight of stone steps connecting with the passage above. The steps are worn in the centre to a depth of nearly three inches, indicating long use. On either side of the stairway are two columns of stone neatly dressed, placed there to support the roof. In no place were there any timber supports in the passages that radiate in all directions for two thousand feet into the mountain. The only tools or implements of any kind found are a number of curiously shaped wedges, made of a metal of which, if it is not, closely resembles copper and is very hard. They are eighteen inches in length and two and one half inches in diameter, and rounded at the head, flattened toward the centre to nearly four inches in width, and tapering to a wedge about one and a half inches broad at the small end. Four of these wedges have been found in all — one in the débris at the foot of the stairway and three at the fall of the coal at the extremity of one of the chambers, driven half their length into the coal near the top of the vein. Two of these have been picked out by the miners, and the other still remains where the mysterious hands that drove it left off their labors. No other tools of any description have so far been discovered, but further investigation may bring more curiosities to light. Everything visible goes to show the great antiquity of the place. As to who the miners were or the lapse of time since this work was done it is simply conjecture. The surface of the mountain and the country on that side of Big Sandy for several miles would indicate to the most casual observer that it had never been occupied since the country has been known to Europeans, the surface being rough and rocky. What is now supposed to be the same coal vein, about six miles west of here, has been worked for several years. — *Baltimore American.*

SOME INSTANCES OF WIND-PRESSURE.

Atlanta, March 12, 1880.

To the Editor of the American Architect:

Dear Sir, — Reading some of the late articles on the Tay Bridge disaster I am reminded of some instances of extraordinary action of the wind that have come under my own notice. In 1858 I travelled in the backwoods of Canada after a severe storm (near the Georgian Bay). The country was nearly all primeval forest, and looked as if gusts of wind had come along and, wherever they struck, thrown down every big tree in their way. Nothing stood up except young saplings which would bend and spring up again. The edges of the windfalls were sharp and made the country look like scattered clearings in the forest. In London, Ohio, I saw, in 1867, a monument in a cemetery, consisting of the ordinary die and spire. The spire-top was eight inches square; a small piece was put on with plaster at the top to form the plinth for an urn. The urn was round, and about the form and dimensions shown[1] (simply turned in the round), a dowell-pin in the bottom projecting four inches. The urn had been lifted off the monument and laid on the ground about four feet from the monument. The dowell-pin was not bent, and the little piece cemented on was not moved or scratched. There had been a wind-force capable of lifting a round marble urn over four inches directly upwards (to clear the dowell-pin)! If I had n't seen it I should at once rank it with Munchausen and his horse tied to the church steeple, but this was evidently a square lift!

J. M.

AMERICAN BUILDING MATERIALS.

STEATITE OR SOAPSTONE.

Steatite or soapstone abounds in some places in the central parts of Arkansas. This State has three thousand miles of water navigation, and the Arkansas River, flowing through the whole width of the State, from west to east, affords at all times good boatable water for the floating of barges and flat-boats, that could carry to markets in the Southern and Eastern States large quantities of rocks and other building materials, which, of admirable kinds and in great variety, Arkansas can supply. The Arkansas soapstone or steatite can be quarried with great ease, works well under tools, and can be sawn with a common saw into flags, blocks, and slabs of any desired size and shape. For linings of furnaces, cook ranges, foundry cupolas, chimney backs, and stoves, there is nothing superior. The chips, débris, and dust of steatite quarries are materials that come into play in many ways. Steatite dust makes the best machinery lubricant now known. Excellent steatite beds, in vast size, also exist in Northern Georgia and in Central Texas. The steatite quarries of Vermont, New York, Pennsylvania, Maryland, and Virginia have long been known and used.

ALABASTER.

Some very beautiful varieties of alabaster are abundant in the central parts of Missouri. Slabs and blocks have been quarried out and dressed, which take a fine polish and have a good effect. The stone is so soft and smooth-grained as to admit of being cut with a penknife, or shaved with a chisel or plane. Mantels, table-tops, window-casings, balustrades, ewers, urns, and all kinds of large or small ornamental objects can be made of these alabasters. The alabaster beds occur in immense thicknesses, frequently twenty to sixty

[1] We omit our correspondent's sketch. It shows the urn to have been about two feet high.

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feet in depth. They occur as cave formations, of which the caves are sometimes a mile or two in length. The alabasters are of different colors, which vary in the different kinds from clear amber to dark coffee or dark wine color. The beauty of alabaster marble lies in its peculiar translucency and semi-transparency. Very little or no practical attention has yet been given to the alabaster marbles of Missouri. Similar formations are known to exist in Arkansas, where the quantities are apparently inexhaustible, and they range through several counties. Southern California contains vast quantities of beautiful kinds of alabaster. Colorado, particularly the southern half, has likewise some very fine varieties. Heretofore the finest alabasters were procured from Italy and Spain. Some purple and delicately veined qualities are obtained from other parts of the north-shore countries of the Mediterranean Sea.

HYDRAULIC CEMENT ROCKS.

This class of materials in the United States is found in several different geological systems. The chief sources of supply are from the lower, middle, and upper silurian systems and the carboniferous system, or the stratifications of the coal fields. In New York, Pennsylvania, Maryland, Virginia, and Tennessee, the hydraulic cement mills get their rock from the limestones which belong both to the Trenton Group, the base of the entire silurian system, and the Ondaga Salt Group and the Clinton Group, which belong to the middle of that large system. In the valley of Virginia, running from the Potomac to the mountains of Tennessee, various limestone strata in the silurian and carboniferous systems contain excellent hydraulic bands. This is likewise the case in Western Maryland and West Virginia. In Ohio, Indiana, and Kentucky, and in Illinois, Missouri, Arkansas, and Kansas, admirable hydraulic limestones abound in both the silurian and the carboniferous systems. Immense beds are often seen cropping out along the borders of the coal fields in the West. This also occurs at the East in the great Appalachian coal field. Of late years, explorations in Texas have shown the existence of vast repositories of such useful rocks there also. Particular mention may be made of those stratifications which occur in the Gulf front of Texas, and are also abundant in the interior, in what may be called the midland tier of counties, running from the Red River southwestward to the Rio Grande. As the coal fields of the trans-Mississippi belt of States run actually for nearly one thousand seven hundred miles, — or from Wisconsin to Mexico, and across the Rio Grande into that republic, — so, likewise, these valuable rock masses, the hydraulic limes, prevail in numberless localities all along the same great belt. These resources are of considerable value in the present and future works of engineering and architecture in America. As yet they have made no figure in the books of scientists; but as public works progress, they cannot remain long neglected.

THE AGALMATOLITE OR "INDIAN IMAGE STONE."

This peculiar material is found quite abundantly in South Carolina and in some parts also of North Carolina. It has handsome light colors, and lies disposed in great, thick beds which are easily approachable, and the material works well, so as to lift out of the quarries and ledges in sizable masses. It is soft, smooth, and extremely fine-grained, and is in many ways adapted for modelling carving, sculpture work, and statuary, in the almost countless places where inside architecture requires delicate capitals, brackets, and other enrichments. It is supposed that its name, "Indian image stone," arises from the fact that the aborigines were in the habit of using it for some of their vessels, their pipes, and occasionally their images. The agalmatolite is a member of the great metamorphic system which is so widely spread throughout the Southern States. This system of rocks begins in New England, and then sweeps southwest-by-south, through some fifteen States, for over 1,200 miles. Along its course are numerous exposures of the serpentine rocks of which this appears to be a variety.

THE "COTTON STONE" OF MISSOURI.

This is a beautiful rock of great softness, whiteness, and fineness of grain. It is a member of the great silurian system, which constitutes so large a part of the States of Missouri, Arkansas, and Kansas. It is a beautiful magnesian limestone, and occurs usually in flat or broadly undulating beds, extending for miles in various directions. It occasionally crops out of the sides of the hills and the ridge-spurs of the Ozark Mountains. The beds of the "cotton stone" are one foot or more in thickness. It is common near some of the lead and zinc mines in the central belts of the State of Missouri, and the miners, in exploring the level of mines, or the metal formations, are very apt to strike with their tools this particular rock, which lies both above and below the level of the metallic deposits. It has been thought that the origin of the name cotton stone, which seems to be traceable to the miners, was determined by the extreme whiteness of the rock, and by its toughness, tenacity, and peculiar character on being struck by a pick, since it yields very slightly, and somewhat as would be the case if a dense mass of raw cotton tightly compressed were similarly struck. This interesting rock is favorably exposed in numberless places in more than thirty counties in Missouri, which are traversed by main lines of railways. Its extreme whiteness, its prevailing color, is one of its especial values and advantages. The qualities of the cotton stone and the way it works under edged tools indicate that it can be utilized in various branches of architectural work and ornamental art. The structure of the material is quite uniform, and it can be cut and carved in one direction as well as in another, and it may be, perhaps, claiming not too much for it, to assert that it is eminently suited to some kinds of sculptured work, and especially for statuary. The cotton stone is naturally outcropping in the lead and zinc regions of Central and Southeast Missouri.

THE "YELLOW SLATE CLAY" OF NORTHWEST GEORGIA.

This material is unlike any other yet seen or known in any part of the United States. The Slate Hills are conspicuous in a series of counties running across the northern half of Georgia. The slates are geologically of the same paleozoic age that distinguishes the slates of Eastern Pennsylvania, Eastern New York, and Vermont. They all belong to the metamorphic system, — that is, occurring intermediate, in a local as well as paleozoic sense, between the granitic or azoic system to the east, and the formations of the secondary system and tertiary or carboniferous system to the west. The Slate Hills of Northern and Northwestern Georgia rise to the altitude of 300 to 400 feet above the plain of the country around, and this plain is about 1,300 to 1,600 feet above the level of the ocean. The slate is of several good colors, bluish-black, red, brown, and purplish, and also a handsome green. It is uniform in stratification, and all these several colors alternate with each other in the different parts of the hills, so that quarries opened in any one place will usually yield advantageously all the various colors and shades. The inclinations of the strata are generally at such angles as are favorable for quarrying, the dip being from 35° to 60°. The faces of many of the hills are continuous, broad, steep, and smooth planes, consisting of slate in immense tables, and from the fact that the quarries can be worked entirely above water level, and so as to be in every way accessible, it is obvious that the labor and cost of excavating and removing the slates are matters of very little moment. A considerable industry has sprung up here, beginning soon after the close of the late war, and in Polk County quite a thrifty village, Rock Mart, derives its prosperity from its population being employed in the quarries. At various places among the Slate Hills, the colors of the slates have undergone changes which occasionally effect also the composition of the material. This is frequently seen to be a modification of the slate strata into a very peculiar substance that may be best named and described as a "yellow slate clay." It occurs in thick strata, disposed in layers, thick and thin alternately, and all of the strata possess a homogeneousness of structure. The prevailing color of the "yellow slate clay" is a handsome shade between that of yellow ochre and orange mineral. The material can be dug out in very large flakes of almost any thickness or thinness. It can be dug and lifted out with common tools, and never requires any blasting, and as it has a very peculiar and uniform dampness throughout, it lifts easily from its beds, and holds together quite well while the workman splits it into thinner flakes and plates, and then cuts them into smaller squares.

This cutting can be done by ordinary saws and chisels, or even by a common hatchet. If cut out in the sizes of ordinary building brick, and set aside to dry, they rapidly harden, and then bear a very close resemblance in form and color to the "Milwaukee brick" of Wisconsin. The yellow slate clays also take a fine polish, even by dry-rubbing only, and when polished they show a very delicate series of layers, so alternating in hues and shades as to be somewhat ribbon-like. These layers, all of them yellowish, are very thin, — say from one thirtieth to one fourth of an inch thick. Blocks of brick size have been cut from these broad flakes, which maintain their shape and color, and show no sign of tendency to disintegration or exfoliation.

W. G. ATKINSON.

THE DENVER COURT-HOUSE COMPETITION.

DENVER, COL., March 16, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — Your Denver correspondent, in the issue of February 28, says that all the architects in Denver are at work on the competitive plans for the court-house. This is a mistake, and a slur upon the profession in Denver which they do not deserve. The architects who have built up Denver have too much pride in their profession to slaughter it by such ignoble treatment as the County Commissioners demanded, and they have let the court-house competition alone.

A.

NOTES AND CLIPPINGS.

AMERICAN ART FIFTY YEARS AGO. — The following letter, written to Joseph Hopkinson, president of the Philadelphia Academy of Fine Arts, will explain itself: —

WASHINGTON, 22d December, 1834.

MY DEAR SIR, — The discovery of the unrivalled superiority of the North American school of painting of the present age was not less surprising nor less delightful to me than to yourself. When I heard myself sharply reproved for intimating a doubt whether it would be expedient peremptorily to prescribe that four American artists should be engaged to paint four very large historical pictures of American history to animate the four empty frames of the Rotunda, I was myself prepared to give the whole job to Allston, if he could be scourged into a performance of the contract

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of undertaking it. I had seen several fine portraits by Inman, and tolerable likenesses by others, but of the abominable historical paintings by the artists, whose names you have seen enumerated in the *Intelligencer*, I had no knowledge until I heard the proclamation in the course of the debate in the House. I had almost concluded my best escape from the unlucky exposure of my ignorance would be to withdraw my proposed amendments and apologize to the Raphaels and Michael Angelos and Rubenses and Murillos of our own country now living for the sin, pardonable if it could be, of never having seen or even heard of their Transfigurations, or Descents from the Cross, or other master-pieces crowned with the admiration of the present age, or reserved for the enchantment of centuries to come. But I was a little ashamed even to sound my own retreat, and on allowing the vote to be taken, found to my utter astonishment that a large majority of the House voted for my amendment.

I made no reply to the champions of our native artists. It would have been a very ungracious office for me to decry them, and one which I think nothing could tempt me to assume. I would cherish like the apple of my eye every particle of national fame that we have a right to demand, believing that as regards the fine arts we have none to spare, and for one I have no disposition to claim more than is honestly our own. The majority of the House appear to be sober enough in their opinions on this subject, but the resolution has not yet passed. There may be some doubt whether it will be adopted at all. There are diversities of opinion with regard to the selection of subjects as well as of painters, and party feeling has already mingled in the debate. I shall regret the loss of the resolution, for its passage might operate both as encouragement to the arts and as a reward of merit. But in this as in all such cases that I have ever witnessed, you start with public spirit and you land in a job. You wish to reward transcendent merit, and you have a swarm of bees alighting upon you equally ready to favor you with their load of honey from the thighs or a thrust of the sting from the tail. As for transcendent merit, "Each mother asks it for her booby son." If instead of our pictures for the Rotunda we wanted 400 chefs-d'œuvres, I have no doubt we should have a resolution imperatively requiring that one painter should be selected from each congressional district, and that three fourths of the whole number would be found sons or brothers or cousins to the members from the district, all of course from that richest mine in the world, since the death of the old masters.

Yours very faithfully, John Quincy Adams.

A Colorado Glacier. — A gentleman who has during the last two years traversed the mountains around Leadville, and penetrated almost every one of their secret recesses, informs a *Herald* reporter that there is within twenty-five miles of this city one of the most interesting curiosities of nature, a veritable glacier, presenting all the characteristics of the glaciers of Switzerland, in both magnitude and motion, its progress being gradually down the gulch. The scene of this curiosty is located in the Mosquito range, about fifteen miles north of the pass. Our informant says that he first discovered it about three years ago, while out on a prospecting tour. It was then about a mile in length, and at the bottom of the gulch presented a sheer precipice of ice not less than one hundred and fif y feet in height. Later in the season the place was visited again, and it was found that the great mass of ice had melted until at its face it was not more than one hundred feet high, the loss from the surface reducing its length to about half a mile. Again, early the following year, the place was visited, and the glacier was found to have regained its bulk, showing that the accumulation of ice and snow during the winter was about one third its gross bulk. The rocks on the side of this immense mass of ice show the marks of attrition, proving beyond all controversy that the glacier is in motion. Indeed, the earth at the foot of the glacier heaved up in great masses shows that it is gradually moving down into the valley. During the summer a large stream of water flows from the face of the icy cliff. Our informant is of the opinion that the glacier, as it progresses out of the deep gorge in which it was formed, will slowly melt away, and that it will not last many years. It is out of the way of ordinary travel, and the route to the scene is exceedingly difficult, so that it is not likely to be visited except by prospectors and hunters. — *Leadville (Col.) Herald.*

Wells in the American Desert. — It has lately been proposed to sink experimental artesian wells upon the now arid public lands for purposes of irrigation. There are 900,000,000 acres in the arid region, which includes Arizona, Dakota, Idaho, Montana, New Mexico, Utah, Wyoming, Colorado and Nevada, and portions of California, Kansas, Nebraska, Oregon, Washington, Texas, and the Indian Territory. Not one per cent of this land has yet been sold by the United States, and it must remain unsold for years to come unless some means is found to supply it with water. Government surveys show that 200,000,000 acres of this tract are mountainous, where even with an abundance of water agriculture would be impossible. An equal amount consists of lava beds — "bad lands" without soil or vegetation and desert plains of drifting sand. This leaves an area of 500,000,000 acres of plain and valley land, susceptible of high cultivation and wanting only water. Under the most favorable condition probably not more than three per cent of this land can be reclaimed by the utilization of rivers and small streams now available. The remainder, to some extent, is utilized for pasturage, but the growth of grass is so scanty that it requires from fifteen to twenty-five acres for the support of each head of cattle, and for this reason the land of course could not profitably be sold. In Colorado alone are 40,000,000 acres of this land, capable of producing from twenty-five to thirty bushels of wheat per acre if irrigated. The people of the West desire Congress to appropriate $50,000 for boring artesian wells, the land being the property of the Government. Private enterprise will not undertake the experiment, but let the practicability of irrigation by artesian wells once be established, and private purchasers will be found who will carry on the work of boring at their own expense. Some of the ablest geologists in the country have expressed the opinion that flowing wells can be obtained in many localities on the plains east and west of the Rocky Mountains, and the Commissioner of Agriculture, under whose auspices special attention has been given to the subject, has recommended that artesian wells be sunk. — *New York Tribune.*

Forged Antiquities. — Over fifty forged Babylonian terra-cotta inscribed tablets made at Bagdad, bearing dates from Nebuchadnezzar to Darius, have been thrown on the London antiquarian market.

Norwegian and Swedish Forests. — A rough estimate of the value of the Norwegian forests has put them down at about 550,000,000 of francs, or £22 000,000; and, according to the last census, 13,638 persons were occupied in the wood-cutting and the rafting, the greater part of the men being unmarried and between 20 and 30 years of age. A curious calculation was made in 1870, as to the distribution of the forests in regard to consumption, when it appeared that out of 446 communes or parishes, 102 had a good deal more building timber than was sufficient for their own wants; 129 had as much as they wanted and no more; while 215 had not sufficient, and were compelled to buy. In the matter of of firewood, 139 parishes were more than amply provided for; 173 had just enough; and the remaining 134 had to buy. The exportation of timber from Norway has doubled during the last quarter of a century, the principal ports for the timber trade being those on the Skagerak, to the east of Cape Lindesnaes; while the ports on the west and north of it scarcely send away more than four per cent of the whole. By far the largest quantity (about 78 per cent of the whole) is sent away from the ports between Skiensfiord and the Swedish frontier. The following are the proportions of the different timbers exported in 1870 and 1875: —

	1870. Per cent.	1875. Per cent.
Rough or squared timber	30.6	38.7
Sawn timber	48.6	37.9
Planed timber	10.9	14.5
Small, for fire or pit wood	7.7	5.7
Small, cut for staves, etc	2.2	3.2
	100.0	100.0

The latter item consists principally of birch wood, and is insignificant, by far the largest portion of the exportation being composed of fir and pine. The following table shows the average rate of timber exportation between 1870–74, in stères (1 stère equals 1⅓ cubic yards): —

Great Britain	1,308,400 stères, or	55.3	per cent.
France	321 600 "	13.6	"
Holland	267,900 "	11.3	"
Germany	190,000 "	8.1	"
Denmark	134.100 "	5.7	"
Belgium	90,500 "	3.8	"
Other countries	35,000 "	2.2	"
Total	2.347,500	100.0	

The average value of timber exported between 1871–75 was 61,000,000 francs per annum, at the average price of 20*s.* 9*d.* per stère. There are also exported about 250,000 kilogrammes (1 kilogramme equals 2⅕ pounds) of oak bark every year, together with an average of 4,500,000 kilogrammes of wood pulp for paper-making. This branch of trade, however, is increasing, and in 1878 it amounted to more than 19,000 tons, — a very large amount, seing how recent is the commencement of the trade of making wood *pâte*, few of the factories dating further back than 1870. Like the Norwegian forests, those of Sweden are composed principally of different species of fir and pine, birch, alder, and aspen trees, with the oak in the provinces south of the Dalelf, and the beech in the still more southern districts. In addition to the true forest, almost all the large properties, whether state or private, possess immense pasturages, more or less wooded with the trees above mentioned, as well as with ash, elm, maple, lime, etc., while some localities in Middle and Southern Sweden possess large plantations of mulberry trees. It is somewhat difficult to give an exact computation of the Swedish forests, as Lapland, which contains large woods, partly the property of the state and partly that of private individuals, has not been yet surveyed. Swedish territory, deducting the rivers and fiords, occupies 40,672,000 hectares (1 hectare equals 2½ acres), from which should be subtracted 4,693 hectares for fields and cultivated land, leaving 35,979,000 which may be classed under forest land But a great proportion of this is rough and desolate moorland, strewn with great rocks and intersected by bogs and marshes, so that we cannot place the true forests at more than 16,443,000 hectares, or about 40 per cent of the whole country; and at least two thirds of this are situated to the north of the Dalelf, the southern provinces being comparatively sparsely wooded. Of all the rough and forest land, 5,221,500 hectares belong to the state (about 15 per cent), and the remainder of 30,757,500 to private owners. — *Journal of the Society of Arts.*

February's Fires in Chicago. — The following is the report of fires for the month of February, 1880, as furnished by the Fire Insurance Patrol reporter: Total number of alarms, 52; second alarms, 3; second and third combined, 1; stills, 44. The causes reported are as follows: False, 17; chimney fires, 12; spontaneous combustion, 6; communicated, 5; children with matches, 3; supposed incendiarism, 3; tramps, 3; defective chimney, 3; sparks from chimney, 2; ignition of clothing from stove, 2; explosion of kerosene lamp, 2; overheated kiln, 2; and 1 each overheated chimney, upsetting lamp, cigar stub left on bed, ashes from tobacco pipe, chimney without flue-stopper, ignition of wood partition from boiler, unknown, ignition of lace curtain from gas jet, boiling over of a kettle of lard, ignition of escaping gas, finishing rags too near stove, mixing bay rum near stove, rats with matches, spring placed in pot of grease for tempering, explosion of gasoline tank, leaking rubber gas tube, improperly constructed foundation of boiler, hot ashes deposited in wooden box, match or cigar-stub deposited in waste basket, hot journal, explosion of pot of varnish, smoky chimney, lighting fire with kerosene oil, hot ashes deposited against burner, defective flue, hot flat-iron, defective stove-pipe, defective fire-box, match taken up in carpet-sweeper, ignition of hyperion oil in lamp and probably from watchman dropping spark from lamp or pipe. Of the buildings, 21 were brick, 5 were stone, and 31 were frame; and were occupied as follows: Dwellings, 30; barns, 6; rag stores, 3; grocery stores, 2; furnished rooms, 2; tannery, 2; meat market, 2; offices, 2; furniture stores, 2; warehouses, 2; planing mill and box manufactory, 2; picture-frame manufactory, 2; and one each saddlery, powder store, sidewalk, tug-boat, blacksmith shop, wagon repository, barbers' fixtures, Metallic Packing Company, oil store, dry goods (retail), cement warehouse, feather store, dry goods (wholesale), brick-kiln, tenement, railroad supply factory, flour and feed mill, and paint and oils. Total insurance involved, $715,500; total loss, $54,385.32; total loss to insurers, $36,396.32. The above is a correct list of insurance involved; but the loss does not include the Empire warehouse, which is not settled. February, 1879, 47 alarms, 76 stills, $739,108.35 insurance, $66,767.71 insurance loss; February, 1880, 52 alarms, 44 stills, $715,500 insurance, $36,396.32 insurance loss.

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BUILDING INTELLIGENCE.

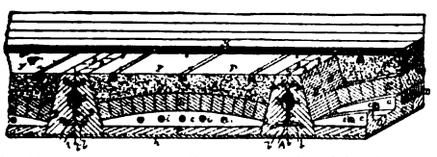
[Reported for the American Architect and Building News.]

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

223,275. FIRE-PROOF BUILDING. — Edward M. Buts, Allegheny, Penn. A A are metallic I-beams, supported in the walls of a building as usual. These girders are enclosed on all sides, both upper and lower flanges, *a a*, and top and bottom surfaces, with fire-clay tile, B. Grooves, *b*, are made across the inner face of each tile, corresponding in size and depth to the upper and lower side flanges, *a a*, of the girder, and the rest of this face is so shaped that when



the tile are placed upon the opposite sides of the girder, as shown, they shall meet above and below the girder. By arranging these tile along the length of the girder, and luting with fire-clay the joints between tile, the girders will be wholly encased on all sides. Channels, *d*, are made along the inner face of the tile, which afford continuous air-passages along either side of the web *a'*, and may communicate, by flues in the walls, with the outer air, and thus serve to maintain the normal temperature of the girders. The lower edges of the tile are thicker than the upper, so as to serve as skew-backs to support the work between the girders. This consists of tile C, having arched-back ribs, *c*. The edges of these tile rest upon the skew-backs *d'*, and when arranged in place, side by side, the lower faces form a practically continuous surface. The curve on the upper edges *c* is the same as that of the arches E, and they may serve as centres for turning such arches. These arches may be built of brick, and are supported by the skew-backs *d'*. Air-chambers D are thus formed between E, C, and *c*, which materially protect the under side of the arches E against heat; also, passages *c'*, in any desired number, are made through the ribs *c*, and thus establish air-communication between the chambers. The spaces above the arches E, in line with the top of tile B, are filled with concrete, F. If a tile floor is desired, a thin layer of cement is first prepared on the surface of the bed formed by F and B, and the tile are laid in this cement in the usual way. In case a floor of boards, H, is desired, strips *r*, of dovetail form in cross-section, are embedded in F. A layer of asbestos sheets, *s*, are arranged over the entire surface, and boards are then laid on the surface thus prepared and securely nailed to the strips *r*.

225,470. SHUTTER-FASTENER. — Charles Garlick, Syracuse N. Y.

225,472. STEAM-HEATER. — Samuel F. Gold, Englewood, N. J.

225,473. ELEVATOR. — John A. Groshon, New York, N. Y.

225,474. WOOD-CUTTING TOOL. — Freeman Hanson, Hollis, Me.

225,484. HEATING STOVE. — Oscar W. Noble, Wakefield, Mass.

225,485. PARALLEL PLIERS. — Erastus N. Parker, Springfield, Mass.

225,488. PUMP. — Julius A. Pease, Chelsea, Mass.

225,496. HOLLOW AUGER. — Edward C. Stearns, Syracuse, N. Y.

225,503. SINK-TRAP. — Edward W. Anthony, Boston, Mass.

225,508. EARTH-AUGER. — Andrew L. Collins, ansas City, Mo.

225,541. SASH-FASTENER. — James W. Todd, New Rochelle, N. Y.

225,558. SASH LOCK AND LIFT. — Edward J. Brooks, Orange, N. J.

225,563. COMBINED ANVIL AND VISE. — Wm. E. Canedy, Rochester, Minn.

225,570. WINDOW-SASH. — David W. Clark, Tidioute, Penn.

225,582. CURTAIN-ROLLER. — Joseph Fisher and John Gamble, Harrison, N. J.

225,598. KILN FOR BURNING BRICK, POTTERY, ETC. — Napoleon B. Heafer and Edgar M. Heafer, Bloomington, Ill.

225,618. MARBLE VENEERING — Thomas C. Lamb, Chicago, Ill.

225,646. ELEVATOR AND FOUNTAIN. — Amzi A. Sandford, Mont Clair, N. J.

9,119. POST AND PILE DRIVER. — (*Reissue.*) William A. Newton, Pappiaville, Mo.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since the last report: —

Charles Rockfeller, 7 two-st'y brick dwells., Woodyear St., between Harlem Ave. and Lanvale St.

Henriette Smith, two-st'y brick dwell., 286 North Gay St., between Mott and Aisquith Sts.

Walter Dulany, three-st'y brick dwell., cor. Charles and Townsend Sts.

D. Howard Tuxworth, three-st'y brick dwell., No. 237 North Gay St.

John McShane, two-st'y brick building, Calvert St., between Lexington and Saratoga Sts.

Mrs. Mary D. Gaehle, three-st'y brick dwell., 346 Lemmon St.

Harriett Raston, two-st'y brick building, cor. Eastern Ave. and Durham St.

J. Southgate Lemon, 5 four-st'y brick warehouses, on Buchanan Wharf, near Pratt St.

CHURCH. — Drawings have been prepared, by J. A. & W. T. Wilson, architects, for the First Colored Baptist Church, on the corner of Caroline and McElderry Streets. It is to be 52 by 87 feet. It is of brick, with sandstone finish, and is to comprise chapel and Sunday-school room in first story and audience-room above. Work is to be commenced at once.

SCHOOL-HOUSES. — The Council Committee on Education have decided to report favorably the ordinances appropriating $15,000 for an English-German school in South Baltimore, $10,000 for a colored school in Northeast Baltimore, and $15,000 for a new building for Male Grammar School No. 7, to be built on the corner of Burk Street and Eastern Avenue, making a total of $40,000 for new school buildings.

Boston.

BUILDING PERMITS. — Since our last report the building permits granted are as follows: —

Brick. — Emerald and Middlesex Sts., 6 tenement houses, about 25′ x 38′; four stories; F. A. Richardson, owner and builder.

Walnut Ave., cor. Dale St., 9 dwells., 22′ x 35′; three stories; Wm F. Griffin, owner.

168 *Newbury St.*, for E. W. Cushing, 1 dwell, 23′ x 42′; C. Chipman, builder; G. A. Avery, architect.

Plimpton St., 1 drying-house, 24′ x 50′; B. D. Whitcomb, owner and builder.

845 *Albany St.*, for Sylvester Bowman, 1 stable, 40′ x 67′; Wm. Morse, builder.

Wood. — East Sixth St., 2 dwells., 19′ x 32′; Wm. T. Eaton, owner and builder.

Parsons St., Ward 25, 1 carpenter shop, 23′ x 29′; J. W. Cushman.

Metropolitan Ave., for L. C. Wolkins, 1 machine shop, 20′ x 85′; A. Rogers, builder.

248 *Princeton St.*, Ward 1, for T. Sheffield, 1 dwell., 21′ x 32′; G. W. Hargrave, builder.

Montana St., Ward 21, for A. M. Gardner, 1 dwell., 28′ x 32′.

Repairs and alterations very active.

SLAUGHTER-HOUSE. — The Boston & Albany Railroad Company proposes to build a large slaughter-house in East Boston.

Brooklyn.

BUILDING PERMITS. — *Willoughby St.*, 1 four-st'y factory, 50′ x 97′; owner, A. P. Sevens & Co.; architect, Carl F. Eisenach; builders, Owen Nolan and L. W. Seaman, Jr.

Prospect Ave., cor. Fourth Ave., 1 three-st'y frame store and dwell., and 4 three-st'y frame dwells., 16′ x 40′; cost, each, $2,500; owner, D. S. Arnott, 705 Fourth Ave.

Bushwick Ave., 1 two-st'y frame store and dwell., 20′ x 39′; cost, $1,800: owner, C. Roth, 91 Graham Ave.; builders, Andreas Vath and John Rueger.

Seventh Ave., cor. Lincoln Place, 5 three-st'y brownstone dwells., 20′ x 45′; cost, each, $7,000; owner, William Flanagan, 429 Flatbush Ave.

Vanderbilt Ave., cor Bergen St., 1 three-st'y brownstone stores and flats, 20′ x 45′; cost, about $7,000; owner and builder, W. C. Donnellon, 4 Jefferson Park; architect, Robert Dixon.

Pacific St., cor. Henry St., 2 one-st'y brick stores, 20′ x 14′; cost $1,000; owner, James Ruthven; architect, Carl F. Eisenach; builder, Samuel R. Goodsell.

Henry St., 3 one-st'y brick stores, one 13′ 6″ x 45′, one 16′ 6″ x 45′, and one 13′ 6″ and 11′ 6″ x 45′; cost, $2,000; owner, James Ruthven; architect, Carl F. Eisenach; builder, Samuel R. Goodsell.

Graham Ave., cor. Maujer St., 6 one-st'y frame stores, 12′ 6″ x 38′; cost, $4,000; owner, Daniel Maujer, Grand St.; architect, John J. Clyde; builders, Jenkins & Gillies.

Broadway, 1 two-st'y frame store and dwell., 18′ x 52′ 4″ x 35′ x 40′; cost, $2,200; owner, F. Herr, 778 Broadway; builders, Johnson Brothers.

Park Ave., cor. Franklin Ave., 1 three-st'y brick store and dwell., 20′ x 50′; cost, $5,500; owner, A. E. Hoddersen, 122 North Portland Ave.; architect, S. Harleson; builders, J. Lambart and W. M. Zang.

Floyd St., 1 two-st'y frame dwell., 19′ x 40′; cost, $2,000; owner, George Loeffler, 140 Floyd St.

ALTERATIONS. — *Atlantic Ave., No.* 128, one-st'y brick extension, 30′ x 38′; cost, $1,500; owner, James Thompson, 121 Atlantic Ave.; architect, Carl F. Eisenach; builders, Kelly & Zang.

Fulton St., No. 287, add one story; cost, $1,300; owner, S. A. Willoughby, Saratoga, N. Y; builders, Wright & Brook.

Myrtle Ave., No. 175, two-st'y brick extension, 10′ x 20′; cost, $1,000; owner, John Van Glahn, 175 Myrtle Ave.; architect, J. D. Reynolds; builders, Morris & Selover.

Sanford St., Nos. 222 *and* 224, two-st'y brick extension, 30′ x 16′; cost, $1,500; Philip Camminoni, 222 Sanford St.; architect, S. H. Usmon; builder, R. R. Kelly

ASYLUM. — Messrs. Parfitt Brothers are the architects of the proposed extension of the Home for the Destitute, on Butler Street. It will cost about $40,000.

HOSPITAL. — Ground will soon be broken for the new Eastern District Hospital and Dispensary, which is to be built in South Third Street.

Chicago.

MATERIALS. — Wages remain stationary as yet. Bricklayers have given notice that they shall ask for $3 on and after April 1. While but few of the craft are or will be employed at that time their demands will be complied with. A general advance of wages cannot take place until new brick are manufactured. Our last year's stock of Chicago brick, and all brick within reasonable transporting distance, are about exhausted. Building operations are therefore substantially at a standstill until brick come in, May 10, say. In the mean time everybody will have got ready, and will be anxious for a good start at that time. There will be more work than men to do it, and strikes and higher wages the inevitable result.

Milwaukee.

BUILDING PERMITS. — Permits issued since the last report: —

Aldenburg & Boltes, chair factory; cost, $19,000.

H. Schlenstedt, store; cost, $8,000.

H. Schlenstedt, block of dwellings; cost, $9,000.

A. Kloes, addition to store; cost, $2,800.

R. Nunemacher, addition to dwelling; cost, $1,200.

Dr. Robinson, double brick dwelling; cost, $13,000.

L. Boyington, store; cost, $1,200.

Hanbutt & Co., stable; cost, $3,000.

C. Schucknett, frame dwelling; $3,000.

F. Stone, frame dwelling; cost, $3,500.

Wm. H. Goese, frame dwelling; cost, $2,800.

New York.

BUILDING PERMITS. — *Seventy-fifth St.*, for A. Droste, dwell. and stable, 20′ x 25′ 6″; brick; Wm. José, architect; cost, $3,800.

Sixtieth St., for John Goerlits, Julius Boeckel, architect, four-st'y brick tenement-house; cost, $8,000; 25′ x 56′ 6″.

Seventy-fifth St., for M. Moss, M. Fainey, architect, brick factory, 20′ x 36′; cost, $2,000; J. H. Slocum, builder.

One Hundred and Fifty-third St., for Wm. Eggalin, Jno. C. Stickler, builder, frame dwell., 21′ 6″ x 26′; cost, $1 000.

One Hundred and Fifty-sixth St., for Michael Homer, J. C. Stickler, builder, frame dwell., 20′ x 28′; cost, $1,500.

Christie St., No. 139, for Harry Miner, Wm. Graul, architect, brick tenement with stores, 23′ 4″ x 85′; five stories high; Henry Wallace, builder; cost, $11,000.

Seventy-fifth St., cor. Second Ave., for A. Droste, brick flats and stores; five stories high; 25′ 6″ x 76′; Wm. José, architect; cost, $18,000.

ALTERATIONS. — *Ninth Ave., Nos.* 81 *and* 83, four-st'y brick dwell. and store, two-st'y brick extension on rear, 24′ x 40′ and 56′; cost, $4,000; owner, ——— Sieman; architect, Wm. Merritt.

Second Ave., No. 1107, store front in basement story; cost, $2,000; owner, Joseph Hutter; builders, Hanlon & Ryan.

Grand St., Nos. 285 *and* 287, new store front and interior alterations; cost, $3,500; owner, Johanna Lichtenstein; architect, Wm. José.

Front St., No. 181, interior alterations and general repairs; cost, $3,000; owners, John Jewett & Sons; architect, H. W. Clements; builders, Meeker & Hedden.

First Ave., cor. Twenty-eighth St., five-st'y brick factory to be raised one story; also, six-st'y extension, 50′ x 42′; cost, $18,000; owner, Solomon Loeb; architect, H. J. Schwarzman; builder, Marc Kidlits.

Fifth Ave., No. 237, one-st'y brick extension on rear, 15′ x 35′, new store front on first story; cost, $5,000; owners, Everall Bros.; architect, Thos. Steub; builder, John Downey.

Seventh Ave., No. 329, new store front on first story; cost, $1,000; owner, Mrs. Butt; architect, Henry Spear; builder, Freeman Bloodgood.

Washington St., Nos. 370 *and* 372, rear part to be raised to four stories and part of rear wall rebuilt; cost, $1,500; owners, T. P. Rogers & Son; builder, H. M. Rogers.

Third Ave., one and two-st'y frame stable, a two-st'y extension on rear, 28′ x 85′; cost, $1,500; owner, Chas. Rivinius, Sr.

Pearl St., No. 299, three-st'y brick factory to be raised to four stories, new store front and interior alterations; cost, $3,300; owners, Emil Calman & Co.; builder, John G. Porter.

Fifty-first St., No. 28, *W.*, three-st'y brick extension on rear, 9′ 3″ x 20′; cost, $3,800; owner, Sidney G. Hartshorn; builder, Charles Burk.

Broadway, No. 1263, new store front on first story; cost, $1,200; owner, William Britten; builder, Samuel Lowden.

Fiftieth St., No. 425, *W.*, to be extended 8′ 2″ on front, internal alterations; cost, $3,000; owner and builder, John F. Moore.

Eighth Ave., No. 643, two-st'y brick store, damage by fire to be repaired; cost, $3,320; owner, M. McFarlane; builder, Henry Wallace.

An extension is to be built to No. 13 W. Forty-sixth Street, for Mr. Thos. Walter. Mr. J. W. Pirsson, architect.

A new wing is to be built to the house No. 1 Washington Square, consisting of dining-room, reception-room, and hall, and the house will be remodelled. The Elizabethan style will be followed. Messrs. Gambrill & Ficken are the architects.

Interior alterations are being made in the offices of Hatch & Foote, No. 12 Wall Street, which will cost $6,500. Mr. Carl I Seiffer is the architect.

An extension is to be made to the residence of Mr. J. Bryan, corner Madison Avenue and Seventy-fifth Street, to cost about $6,000.

APPRAISERS' STORES. — Mr. Jackson, local superintendent of repairs on United States buildings has prepared plans for a new four-story building for the appraiser's department.

BANK BUILDING. — The First National Bank and the Bank of the Republic have accepted the designs of Messrs. Peabody & Stearns, of Boston, for the building to be erected for them on the corner of Wall Street and Broadway. It will cost $500,000, and will have a frontage on Broadway of 71 feet 8 inches, and a depth on Wall Street of 91 feet 6 inches.

CHURCH. — An extension is to be made to the Church of the Beloved Disciple on Eighty-ninth Street, embracing a choir-room and study. Ohio stone will be used. Mr. J. W. Pirsson is the architect.

FLATS. — Work has just commenced on the flats to be built on the corner of Fifty-second Street and Broadway. The building will be eight stories high, the first story will be stone, above brick and terra-cotta. The style is Queen Anne, and the cost will be about $120,000. Mr. Ferdinand Meyer is the owner; Messrs. Lamb & Wheeler, architects.

GRANITE WORK. — The Park Commissioners have accepted the designs of Messrs. Gambrill & Ficken for the pedestal for the statue of Wm. Cullen Bryant, which is to be very richly ornamented. Also for the pedestal of Ward's statue of The Early Pilgrims.

HOUSES. — On Sixty-ninth Street and Madison Avenue six houses are to be built for Mr. Anthony Mowbray. Two will be of brick and stone, and four brown-stone.

OFFICE BUILDING. — On the lot Nos. 21 and 23 W. Twenty-sixth Street an office building is to be built for the Astor Estate. It will be of brick and granite. Mr. Thomas Stent, architect.

STORES. — Mr. Wm. Shickels is preparing the plans for the

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store to be built, for R. Arnold and Henrietta Constable, on Twenty-third Street. It will be six stories high and have a frontage of 99 feet 6 inches on Twenty-third Street, and 70 feet on Twenty-fourth Street. It is to be of brick and stone, and will cost about $150,000.

On Green Street, corner of Houston, a 60 feet front store is to be built of brick and terra-cotta, at a cost of about $35,000. Messrs. Gambrill & Ficken, architects.

On White Street a store, 25 by 76, is to be built from design of Mr. J. Morgan Slade, to cost about $20,000. The first story will be iron, above brick and stone, with eight iron columns.

Philadelphia.

Additions. — *Ludlow St.*, cor. Thirty-first, 1 three-st'y addition to factory, 48′ x 90′; owners, Goodell & Waters; builder, Chas. D. Supplee; day's work.

44 North Thirty-eighth St., addition 20′ x 40′; three stories; E. W. Woolman, owner and contractor; cost not given.

Alteration. — Messrs. Wilson Bros. & Co. have drawn plans for the alteration and extension of Mr. J. J. Morton's house, on the corner of Nineteenth Street and Green Street. New brown-stone fronts will be built.

Asylum. — A new building is being built for the Pennsylvania Industrial Home for Blind Women.

Factories. — *Montgomery St.*, cor. Randolph, 1 four-st'y factory, 54′ x 95′; owner, C. A. Blessing; no contractor.

Tayler St., near Kensington Ave., two-st'y factory, 30′ x 90′; contractor, R. J. Whitesides & Son; cost not given.

Unity St., cor. Baker, two-st'y factory, 47′ x 175′; owner and builder, Charles Cranshaw; cost not given.

Freight-House. — The Old Navy Yard, one freight-house, 443 by 50 feet; owners, Pennsylvania Railroad Company; contract, not yet awarded.

Hall. — *Germantown Avenue*, south of Norris Street, one four-st'y hall for Liberty Council No. 11, W. A. M., 40 by 84 feet; cost, $8,000.

Houses. — *No.* 3828 *Lancaster Ave.*, 1 three-st'y stone dwell., 20′ x 70′; owner, Peter Weber; not awarded.

Tanner St., cor. Twentieth, 6 three-st'y houses, 15′ x 40′; contractor, Geo. H. Brinkworth; cost, about $11,000.

Fortieth and Aspen Sts., 5 three-st'y dwells., 18′ x 50′; J. F. Winner, contractor; cost, $25,000.

The house on the corner of Fifty-fourth Street and Columbus Avenue, destroyed by fire a year ago, is to be rebuilt for Mr. Rife. Messrs. Wilson Bros. & Co. are preparing the plans.

Insurance Building. — The result of competition for plans for the North American Insurance Company has not yet been made public.

Stable. — *Twenty-second Street*, south of Market, three-story stable, 150 by 104 feet; owners, Adams Express Company; builder, George Watson; cost not given.

St. Louis.

Building Permits. — Twenty-eight permits have been issued since our last report, of which nine are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows: —

Owners.	Use.	Stories.	Rooms.	Cost.
J. N. Barley.	Dwelling.	3	9	$4,000
F. R. Rehman.	Dwelling.	2	13	3,900
Lauenberg Bros.	Dwelling.	3	10	5,000
Mrs. M. N. Bust.	Dwelling.	2	12	3,500
Dr. J. H. McLean.	Store.	3	9	5,500
Mrs. E. McKee.	Store and Dwelling.	3	10	5,000
A. S. Morrison, V. S. Penquet.	Store.	3	9	9,000

General Notes.

Adams, Mass. — Mr. S. C. Earle, architect, of Boston, has prepared plans for the new Church of St. Mark.

Amherst, Mass. — Mr. Geo. Cutler has his brick block nearly completed; cost, $8,000; W. F. Pratt, of Northampton, architect.

Atlantic City, N. J. — A cottage is to be built for Mrs. Woelper, opposite the Lippincott Villa. Messrs. Wilson Bros. & Co., of Philadelphia, architects.

Bangor, Me. — The plans for a new opera-house have been received. The seating capacity will be 1,233. The building will be on Main Street, and work will probably begin at once.

Buffalo, N. Y. — The design of George Keller, of Hartford, has been adopted for the soldiers' and sailors' monument.

Burlington, Io. — Mr. C. A. Dunham, architect, has the following work on hand: —

An addition to Thomas Hedges' block, 34 by 40 feet, one story; estimated cost, $3,000.

House for W. O. Ware; wood; cost, between $5,000 and $6,000.

Cottage for I. H. McPortland; cost, $2,000; two stories; wood.

An addition and other improvements upon a cottage for Chas. Wundt; estimated cost, $3,000.

The Burlington Steam-Heating Company are now building a boiler and fuel room, 60 feet by 117 feet 6 inches, of brick, 18 feet high.

M. C. McArthur is building two stores, 40 feet front by 80 feet deep, three stories high; brick.

John Burg has contracted to put another or third story upon his wagon shop, 30 by 80 feet, of brick.

Work on the new court-house will be resumed on the 1st of April.

Cambridge, Mass. — The present members of the Harvard Hasty Pudding Club have subscribed over $2,000 to start a fund for building a club-house.

Cedar Rapids, Io. — It is said that Hon. George Green will build a theatre this summer large enough to seat 2,000 persons.

Cleveland, O. — The Case Avenue Presbyterian Church is to be built of stone, at a cost of $25,000. Mr. Joseph Ireland, architect.

Fisher's Island, N. Y. — Mr. Geo. H. Bartlett is building four summer houses, from plans by Mr. Evan Burdick, of Norwich, Conn.

Gardner, Mass. — Mr. V. W. Howe is building a frame house on Main Street; cost, $6 000.

Mr. I. F. Thompson is building a three-tenement frame house on Chestnut Street. Fuller & Delano, of Worcester, Mass., architects.

Garrison's, N. Y. — A tower and residence is to be built for Wm. H. Osborne, Esq., of New York. It will be of rough stone, with cut-stone finish, in the French Gothic style. Mr. J. Morgan Slade, of New York, is the architect.

Greensburg, Ind. — The County Commissioners have decided to build a new jail.

Hadley, Mass. — Dr. Bonney is building a house here. W. F. Pratt, Northampton, architect.

Harrisburg, Penn. — Mr. F. E. Davis, architect, Baltimore, is preparing drawings for a new school-house, to be built here, 108 feet front by 123 feet deep, two stories high. It will cost $16,000.

Hartford, Conn. — A frame house is building on Vanderbilt Hill, West Hartford, facing Farmington Avenue. It is 105 by 108 feet, two stories high, with a gambrel roof, surmounted by an octagon tower 85 feet in height and 22 feet in diameter; cost, $5 ,000.

There are four houses building on Prospect Avenue, for Wm. A. & H. W. Ewing; two of them are of brick, in English cottage style, costing $12,000 and $7,000 respectively. The frame houses are for Geo. Foster and Geo. E. Hatch, costing about $10,000 and $5,000 respectively.

Mr. Wm B. Windsor is building a brick stable on Main Street, 50 by 60 feet, costing $3,000. Mr. John C. Mead is the architect and contractor.

Mr. John C. Mead also has plans in hand for several buildings, among which is one for Mr. George Kellogg, to be built on Asylum Avenue, of pressed brick, and Portland brown-stone finish, costing about $9,000.

A frame house for C. G. Munyan is to be built on Gillett Street, costing about $6,000.

Mr. Wm. M. Miller is building a frame house on Washington Street, costing about $5,000; S. W. Lincoln, architect; John C. Mead, builder.

Highbridgeville, N. Y. — The building and stable of the Second Police Precinct is to be altered and repaired.

Indianapolis, Ind. — Plans of the two new school-houses proposed to be built during the coming summer are now on inspection at the offices of the school commissioners. One is to be at the corner of East Vermont and New Jersey Streets. The other will be on Beeler Street, near Seventh.

Building permits were issued by the City Clerk of Indianapolis during the first two months of 1880, for the erection of buildings and other improvements, amounting to $37,500 more than the permits issued during the corresponding months last year.

The Public Library Committee has accepted the plans for the new library building prepared by C. A Wallingford. The building will be 120 by 39½ feet, two stories high, constructed of brick and stone. The building is to be ready for occupancy by September 1; estimated cost, $14,000.

Jewett City, Conn. — Rev. Thos. B. Jaynt is completing a frame house on Main Street; cost, $4,500; Samuel E. Allen, of Willimantic, Conn., architect.

Kankakee, Ill. — The Illinois Central Railroad will probably build a round-house here the coming summer.

Lansing, Mich. — A botanical laboratory is building for the Michigan State Agricultural College, from designs prepared by Messrs. Watkins & Arnold, architects; cost, $6,500.

The cost of Michigan's new State Capitol is said to have been $15,000 under the estimate.

Lexington, Ky. — John W. Lell is to build a brick store near the post-office.

Lynn, Mass. — The laying of the corner-stone of the new Y. M. C. A. building will take place March 30

Millbury, Mass. — Mr. Peter Simpson, Jr., has plans being drawn by Fuller & Delano, of Worcester, for a house and stable in this village; cost, $15,000.

Monterey, Cal. — The Southern Pacific Railroad Company is building a three-story hotel, 400 feet long, in the Monterey Grove.

New Haven, Conn. — There is a great scarcity of building brick in New Haven. The North Haven Yards are unable to meet the demand, and the price has advanced from $8 to $11 per thousand.

New Milford, Conn. — A new Episcopal church is to be built here, at a cost of about $30,000.

Newport, Ky — It is reported that the Masons are to build a new temple.

Newport, O. — The Masons of this city contemplate building a grand temple, and are negotiating for the purchase of the lot on the northwest corner of Mayo and Saratoga Streets.

Newport, R. I. — The ground for the cottage for Mr. Christopher C. Baldwin, of New York, has been broken.

Northampton, Mass. — Mr. W. F. Pratt has plans in hand for Mr. L. B. Williams's frame house, Mr. W. T. Clement's house, Mr. Andrew Wood's house; C. H. Dickinson's store, Belding Brothers & Company's new silk mill, to be of brick, four stories high, 140 by 44 feet. Geo G. Baker, Rockville, Conn., is the contractor for mason-work, and C. Butler Smith, Northampton, for the carpenter-work.

Norwich, Conn. — Mr. S. L. Geer is building a frame house on Franklin Street, from plans by Mr. Evan Burdick.

Mr. Burdick also has plans in hand for one four-tenement brick block, also one double brick house.

Mr. Palmer Smith is building a three story block of brick and marble, fronting 62 feet on Franklin Street, to be used for stores and tenements. Mr. Evan Burdick, architect.

Mr. John M. Brewer is about building a two-story frame house on Cliff Street.

Orange, Mass — Mr. J. W. Wheeler is about building a frame house and stable, costing $12,000. Plans are now in the hands of Fuller & Delano, of Worcester.

Phillips, Wis. — The new court-house for Pierce County is to be built here.

Saco, Me. — In addition to the big pier to be built at Old Orchard Beach by New York parties, the Legislature has granted a charter to a company, — land owners at Old Orchard, — who propose to build a large pier, starting at Union Avenue, and extending 1,500 feet into the sea. The pier is to be 100 feet front and built of solid masonry. The company's capital stock is $100,000.

Streator, Ill. — A new jail, town-hall, etc., will soon be built from plans by Mr. F. S. Allen, architect; cost, $7,000.

Versailles, Ky. — To-day bids are received for improving and building the Woodford County Court-House in this city.

Wabash, Ind. — The Presbyterians are to build a new $17,000 church this summer.

The oldjail is to be torn down at once.

Ware, Mass. — Mr. L. W. Robinson is building a brick block, to be used for stores.

Waverly, Md. — Messrs. J. A. & W. T. Wilson, of Baltimore, architects, have made drawings for an addition to the country house of Mr. Thos. J. Wilson, near Waverly, Baltimore County. It is 22 by 24 feet, and three stories high, of brick, and is at present under contract.

Westboro, Mass. — Rev. C. J. Cronin is building a frame house on Main Street, cost $5,000, from plans by Fuller & Delano, of Worcester, Mass.

West Hartford, Conn. — Mr. James M. Thompson is building a stable at West Hartford Centre, costing about $5,000; Mr. John C. Mead, architect and builder.

Westville, Conn. — A store and tenement is building by Colonel Sperry above the raceway, near the bridge.

Williamsburg, Mass. — H. M. Porter is building a new store for himself, from plans by W. F. Pratt, of Northampton.

Willimantic, Conn. — Mr. Samuel E. Allen has plans nearly completed for a three-story block for Mr. Dennis Shea, to be built of brick, with marble finish, fronting on Main and Union Streets; stores on first floor and tenements above.

Geo. M. Harrington, of this place is about to build a frame cottage; Samuel E. Allen, architect.

Windsor, Conn. — The Methodists have raised $4,000 for a church.

Worcester, Mass. — Messrs. Fuller & Delano have plans nearly ready for a brick building, 100 by 32 feet, two stories, to be used for the insurance patrol.

The question of building a temporary hospital, at a cost of $40,000, is much discussed.

Industrial.

Bridgeport, Conn — The Bridgeport Cartridge Company is to build an addition sixty feet long.

Brunswick, Me. — The cotton factory is to be enlarged, and the box factory rebuilt. About twenty tenement-houses are to be rebuilt.

Chicago, Ill. — The Union Rolling-Mill Company will soon build a large wire mill, at a cost of $300,000.

Cleveland, O. — Proposals for building two eight-room school-houses were received March 19.

Danielsonville, Conn. — The Quinebaug Company will probably build a two-story brick mill, 96 by 445 feet, at a cost of about $60,000.

Danville, N. H. — Collins's shoe manufactory is to be enlarged to double its present size.

East Liverpool, O. — Knowles, Taylor & Knowles have concluded contracts for their large additions, which will require 1,000,000 of bricks, 175,000 feet of joist, and 45,000 feet of flooring boards. The new buildings will measure 110 by 228 feet.

East Meriden, Conn. — An addition, 60 by 50 feet, is building to the Parker spoon-works.

Fall River, Mass. — The Flint Mill Corporation is preparing to build a cotton house.

Fisherville, N. H. — A large cotton-mill is to be built here.

Gardner, Mass. — Messrs. S. Bent & Bros., chair manufacturers at South Gardner, are at work on the foundation for a new factory, the main part to be 54 by 49 feet, two stories high, with basement.

Hillsboro, O. — Messrs. Inskip, Austin & Buck are preparing to build a three-story brick flouring mill, corner of West and Beach Streets.

Holyoke, Mass. — John B. Munn, of Northampton, and Charles Baush, will build a foundry near the river road, below Chase's lumber yard, 80 by 40 feet in size, with two smaller ones.

Keene, N. H. — The Troy Blanket Mill Co. are immediately to enlarge their mills.

Moodus, Conn. — A three-story addition, 40 by 50 feet, is to be made to the Chaffee Mill.

Montague, Mass. — J. S. Richardson has commenced the foundations for his new mill.

Natchez, Miss. — Joists are being laid for first floor of the Rosalie Yarn Mill.

The 6,000 spindle addition to the Natchez Cotton Company's Mill is about to be placed under contract.

Niantic, Conn. — The Sturtevant Woolen Mills are to be rebuilt.

Northumberland, Pa. — Robert Chase & Co. are rebuilding their mill.

Oakville, Conn. — A building 70 by 40 feet is to be built in place of the old suspender factory.

Paterson, N. J. — The works of the Danforth Locomotive and Machine Company will be rebuilt.

Piqua, O. — The proprietors of the new paper-mill are getting ready to put up their buildings.

Taunton, Mass. — The Whittenton Manufacturing Company is building a new weaving mill 360 by 151 feet, one story and full basement.

Voluntown, Conn. — Ira G. Briggs & Co. are about to enlarge the Beachdale Mill, by an addition 42 feet in length.

Waterloo, N. Y. — A dye house, 60 by 100 feet, is about to be built for the Waterloo M'f'g Co. from designs of Mr. J. Morgan Slade, of New York

Wilmington, Del. — It is said that the Jessup & Moore Company will spend almost three quarters of a million upon their new paper-mill.

Bids and Contracts.

Burlington, Io — J. Burnham has contracted to build a wareroom, 43 by 50 feet deep, 25 feet high, of stone, for storing flax seed for his mill.

Denver, Col. — Emmet Anthony, architect, Denver, has completed the plans for a store for John D. Alkire. The contract is awarded to I. C. Kelsey: cost, $10,000.

East Liverpool, O. — The contracts for a two-story brick school-house, containing eight school rooms, basement, entry halls, belfry, etc., were let by the Board of Education on Monday, the 22d inst.

Fall River, Mass. — Mr. Wm. Beattie has the contract for the stone-work for the new building of the Durfee Mill Corporation.

Lawrence, Mass. — McClellan & Goodwin, of Chicopee, have contracted with the Washington Mills to build a new mill 324 by 84 feet, to be finished, ready for machinery, by July 1.

Trenton, N. J. — Contract has just been awarded by J. H. Whittaker, architect, for a four-story store, with offices over, on East State Street, near the First National Bank; press brick front, stone finish; John Barnett, Esq., owner; William Johnston, mason contractor; Cubberly & Rafer, carpenters; contract price, $6,900.

Also, several pottery buildings (brick), for Messrs. Dale & Davis, to be built at the junction of the D. & B. B. Railroad and Prospect Avenue; contract price, $22,517; Captain R. S. Johnston, mason contractor; William Mutchler, carpenter contractor.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE rival schemes for elevated-railroads in Boston have both received their quietus for this year by the report of the legislative committee, "leave to withdraw," which was accepted by the legislature. Meanwhile, it is at least a great gain to have a respite of another year to consider the transportation question. Outsiders have their minds generally made up that, whatever the counsel for the horse-railroads may think, it would be a good thing to be able to travel to and from the suburbs and outlying parts of the city with greater comfort and rapidity than is now the case, and, *per contra*, they are sure that the running of an elevated-railroad track in front of the upper windows of the dwellers on our streets would be an intolerable nuisance, which the New Yorkers may be willing to endure, but whose imposition without compensation on their fellow-citizens would and should arouse all the indignant public spirit of the inhabitants of Boston. Nevertheless, two years from now the new Back-Bay Park will be completed, and the "residential quarter" of the city will have begun to invade Longwood, Corey's and Parker's Hill, and the question of rapid transit from these new districts will become pressing, so that Boston will do well to see if some timely recognition of the want cannot be made in the laying out of this region, so as to save it from the possibility of future disfigurement. The problem of passenger travel is not solved, but brutally cut, by elevated roads; underground ways, which are infinitely preferable for all except the passengers, are hardly practicable in the greater part of Boston, and an almost virgin field is offered to the labors of inventive genius. Possibly a modification of the "arcade" plan may present the best solution, and if this should be so, some slight variation, in the grading, raising, for instance, the level of the sixteen-foot intermediate passage-ways between the streets, which are so popular in the city, to a height sufficient to cover a low arcaded road, could be easily provided for, if it were thought of early enough.

THE suit of Mr. E. E. Myers of Detroit, against the State-house Commissioners of Indiana, for damages for the mutilation of his plans, and on account of the manner in which the award was made, to which we referred last week, has been decided in favor of the defendants; the jury having been instructed by Judge Gresham of the United States Court, to bring in a verdict to that effect. This decision, compared with the general disposition of Courts in architects' suits to see that the professional men have their rights respected, shows pretty plainly the contempt with which such scrambles as the Indianapolis competition, and those who take part in them, are regarded by the world outside. It will be remembered that Mr. J. K. Wilson was directed to remodel Mr. May's plan, which stood fourth in the opinion of the judges, to make it conform to the requirements, which none of the designs perfectly fulfilled. He did this, though under protest, and soon after the award was made to Mr. May, and Mr. Wilson was invited to share with him the duties of architect to the Commissioners, which, however, he seems to have declined to do. In all this, unfair as it seems to Mr. Myers, whose plan stood higher than Mr. May's, and to the other competitors, it does not appear that the Commissioners dreamed they were doing anything out of the way. They knew Mr. May to be a good architect; his plan was at least fourth in merit; and feeling that it was in their power by employing him to secure beyond doubt a good building, they naturally managed to do so, rather than risk themselves in the hands of a distant and unknown designer. This is, in our experience, the usual way in which such bodies understand their duties. It is only a few days since we were innocently told of a "competition" for a large building to be erected this season. The Committee, we were informed, had promised the work to Mr. X. whom they all knew; but architects were to be "allowed" to send sketches, which several had asked leave to do, and from these sketches they hoped Mr. X. would be able to work up a fine design. What Mr. X. said to this arrangement we did not hear.

THE rumors of defect, or settlement, in the stone-work of the Albany Capitol which have been floating about for some time, took form late last week in a statement before the Assembly that the sand-stone abutments in the grand corridor were cracking, and a considerable number of the members visited the spot, to find the statement correct. Every one of the piers, the New York papers report, on which the corridor arches rest, has "given way;" that is, we suppose, cracked; the most serious defects appearing in the piers which fall under the granite pillars of the Assembly Chamber. "In several cases," the *Evening Post* asserts, "the sandstone has the appearance of crumbling, on account of the weight resting on the piers." This must probably be taken with a grain of allowance, for it is hardly likely that a building in which Mr. McAlphine, Mr. Fuller and Mr. Eidlitz, have successively been employed, would be designed without ascertaining the crushing strength of the stones employed, and the weights to come upon them. We hope for further information soon: meanwhile, we are glad to see that "the subject is likely to be brought to the attention of the architect and builder." That seems indeed judicious.

THE steam-heating people find the New York aldermen very complaisant, a second company having received permission, over the mayor's veto, to lay pipes in much the same way, and under much the same restrictions, as General Spinola's, which has already begun operations. Still another corporation is applying for the same privileges, with apparently a prospect of the same success. This last company, under the Prall patent, proposes a scheme a little different from the others, and more formidable than either, consisting in the delivery, not of steam, but of superheated water, which will be of course under great pressure, and ready to flash into steam with the force of an explosion on the pressure being suddenly relaxed. Such a mode of high-pressure hot-water heating is used to some extent on a small scale, both in England and here; but is, we think, generally regarded by those in the business here as dangerous, and enormously strong wrought-iron pipes are used for the small calibres of the house service. Very possibly pipe can be made strong enough for the street-mains, but such a matter should not be left to chance. It would be cheaper to have the pipes rigidly tested by a city official, before laying than to shoulder the cost of an explosion or two in the public streets, compared with which the blowing up of a boiler would be trifling.

THE labor troubles do not spread very rapidly, probably for the reason that sufficient employment offers for all who want it, and individuals find it easy to make their own agreements with their "bosses," a system much more congenial to American independence and self-reliance than the sheep-like subjection to the orders of a Union which foreigners attempt to import into our large cities. From their point of view, the Unions in New York have been quite successful, the piano and cabinet makers having generally recalled their men at advanced wages. Mr. Herrman's cabinet-makers, taking advantage of his being distressed with contracts, obtained a still more signal victory, since their employer agrees henceforth not to object to his men leaving the factory to drink beer during working hours. Why they should not have required him to furnish the beer, which certainly would be cheaper for him we cannot see. The Cohoes strike continues: five thousand work-people,

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it is said, being idle, not for the sake of advancing their wages, but because a certain foreman, whom few of them ever saw, has turned out of the mill, for good cause, another workman, equally unknown to them. It would be natural to respect such public spirit, if it were not so often the result of a dullness and incapacity for thought which finds the blind and stupid following of designing leaders easier than the exercise of common sense, and were it not also for a suspicion that a class which tries to cure all its troubles by leaving off work, possibly feels an enjoyment in the idleness itself with which few Americans will sympathize. The San Francisco farce gets less serious and more contemptible every day. We are glad to see that the Citizens' Protective Union has turned its energies to carrying the election of this week, with, it seems, a successful result.

The antics of the sand-lot leaders continue, although with more caution. Some of them calling upon their followers to take up arms much in the same fashion as Kearney, who used to bring upon the platform the rope with which he proposed to hang the bond-holders, would, no doubt, be as much astonished as he to find that any one thought they were in earnest. The San Francisco and New York troubles are curiously connected by a proposition which was made to the piano-manufacturers, to furnish Chinese workmen at fifty cents *per diem*, who, it is alleged, will become expert hands in a month. The operatives scout this idea; but however it may be with Chinese, it is unquestionable that the Japanese cabinet-makers and workers in wood not only equal but far surpass the Caucasians. It will be remembered that the interior of the steamship Gallia was almost entirely finished by Japanese workmen, brought to England for the purpose; and perhaps the competition of Asiatics may yet be formidable to our citizens on the Atlantic as well as the Pacific slope.

New York people as a class have at least one good trait; that, while they are prone to live unheeding in the midst of frightful abuses, so long as they are not immediately concerned, when their attention has once been effectually called to a particular one they set about reforming it with a single-hearted zeal and energy equal to that which they at ordinary times bestow exclusively on their own business. The improved-tenement-house fever, which began none too soon, spreads apace, and we hear from all sides rumors of new structures, which, so far as we can judge by descriptions, and now and then by a drawing or sketch, are, to say the least, creditable both to the architects, who have answered with signal success the sudden call for their services in a new field, and to their employers, whose business-like charity, with its clear-headed calculation of the cost of these efforts to improve the condition of their fellow-men, is so characteristic of the place. Some of the later plans, we are glad to see, avoid the balconies, or open galleries across the front, such as those, for instance, of Mr. White's building in Brooklyn, which are pleasant in theory, but being in practice liable to be hung with clothes and bedding, to say nothing of the promenading of the tenants, are apt to give a frowsy look to the front, not inviting to the better class of applicants for rooms.

The Philadelphia Park Commissioners and the Permanent Exhibition Company seem to be in a fair way to establish a *modus vivendi*, by means of mutual concessions. It has been made so evident that without the help of popular entertainments of some kind the exhibition cannot succeed, that the committee now propose to rule out only dancing, balloon-ascensions, fire-works and cannon-firing. These may, however, be made the subject of special sanction, on occasion. Sunday entertainments, it is understood, will not be permitted. If reports are true, perhaps before the controversy is finally settled, the Main Building will have so far succumbed to time and neglect that it will not be worth while to repair it. If the Sydenham Palace, with its ceaseless round of entertainments, its noble situation, and accumulation of objects of interest, reached by quick trains from all the underground stations in London every few minutes, barely earns enough to pay for keeping its own roof tight, the Fairmount building, if the process is once allowed to begin, may quickly fall into a state of dilapidation which in its case would be hopeless. We see no encouragement, either in reason or experience, to believe that an enterprise for industrial education which requires to be bolstered by entertainments or other outside attractions is of any value for its original purpose.

The Royal Institute of British Architects has taken up the subject of the regulation competitions, and one branch of the question, the employment of a professional architect on the committee of award, is being pressed upon their notice by the the preparation of a memorial, praying them to take some action whereby architects generally may agree not to compete in cases where such an expert is not employed. The number of architects who would bind themselves not to compete on other terms may be inferred from that of the signers of the memorial, which, we are glad to see, has already a hundred and twenty names, including the highest in the profession, with good prospects of obtaining more. With some honorable exceptions, the practice of competitions is as degraded in England as here, and we trust that the profession will arouse itself at last to an effort commensurate with the evils which it is sought to ameliorate or cure. By a singular coincidence, thy St. Louis Institute of Architects at their last meeting took up the same subject, and a schedule was reported, which had already been signed by twenty-five architects, to regulate open competitions for architectural work. We should be pleased to have this fashion spread.

Captain Eads continues to advocate his ship-railway across the Isthmus, and seems to gain listeners. After all, strange as the project seemed at first, the difficulties seem not to be insurmountable, and there is a kind of gigantic simplicity about the scheme which is rather fascinating, if it only seemed to be worth doing. Once lifted on the rails, it is at least as easy to imagine a ship and cargo, weighing perhaps 3,000 or 4,000 tons, safely supported by a system of wheels which would distribute the load equally over the substructure, as a building forty or fifty times as heavy, and irregularly loaded, supported uniformly on piles or piers, each of which presents but a limited resistance; yet the latter is done every day. The preliminary lifting seems the most difficult part to provide for; but with the experience in managing ponderous masses, acquired in the transportation of the enormous blocks of *béton* and concrete used for the Port Said breakwater and the Dublin Wall, blocks which weighed in some instances three hundred and fifty tons each, it would be rash to predict that the task is impossible. The question of course is whether when it was accomplished it would justify itself, and this we doubt. The whole tendency of modern industrial improvement is towards spending money liberally on first appliances to secure the utmost ease of operation in the end, — to the extension of plant for the saving of labor. In the light of this tendency, the Isthmus schemes seem to class themselves, for their promise of usefulness, in this order: first, a sea-level canal, second, a canal with locks; third, a ship-railway.

A story has been circulated in Boston during the past week, that the price of spruce lumber, the staple timber for framing in that vicinity, was to be advanced to an enormous extent about the first of April. The proposed advance was said to be five dollars per thousand feet, which, added to the present price, would bring the cost of that material nearly to the highest point of war times; almost doubling its value within six or seven months. If any of our readers have been alarmed by this report, we will venture to advise them to take courage. Of all varieties of lumber, spruce is the least likely to maintain an inordinate advance. Its market is comparatively limited, white pine generally taking its place outside of New England, while, unlike white pine, the supply of which has limits already visible, the spruce lands of Maine and New Hampshire are only outlaying parts of the vast Canadian forests which lie behind them, and will last for ages to come. Again, this season, when the last year stocks are getting low, and the frost still keeps back the new crop, is usually one of high prices for spruce, and to force them much higher just as the rivers were opening, would be a difficult thing to accomplish. Very possibly a small rise may occur, especially if the season is late; but we shall be surprised to see anything more serious this Spring.

VENTILATION OF GAS-BURNERS.[1]

Where an open fire-place is used, the foul-air exhaust is of necessity at the bottom of the room. The supply must therefore of necessity be from the top downwards; for, as we have shown, if the air enter cold it would otherwise pass off through the fire-place open-

[1] This paper, by the writer of the Open Fire-Place articles, will be incorporated with them in their separate form.

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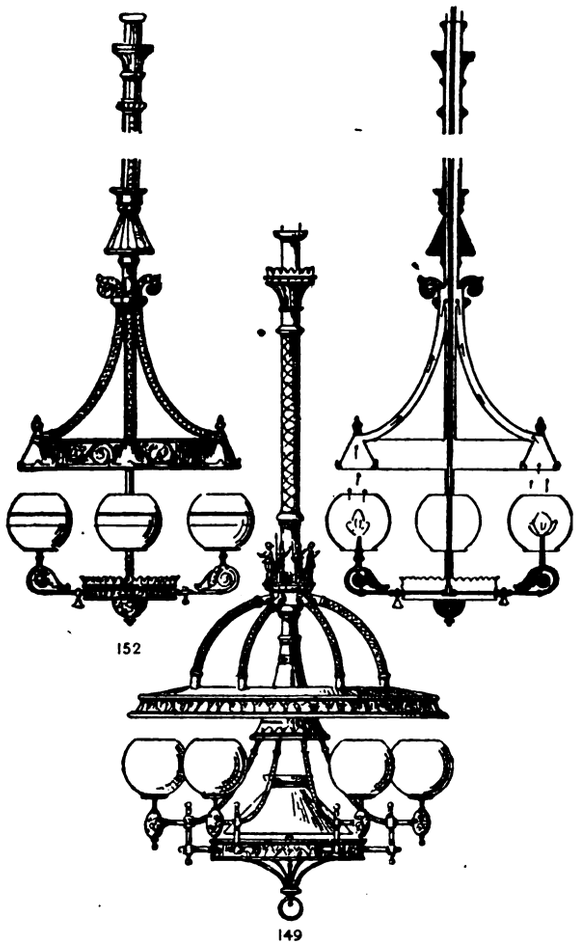
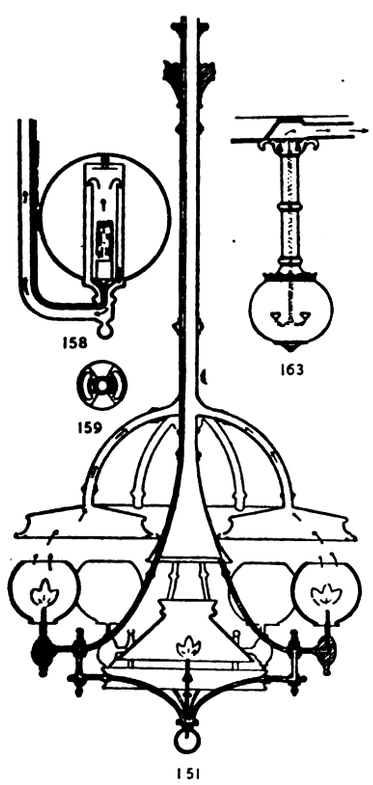
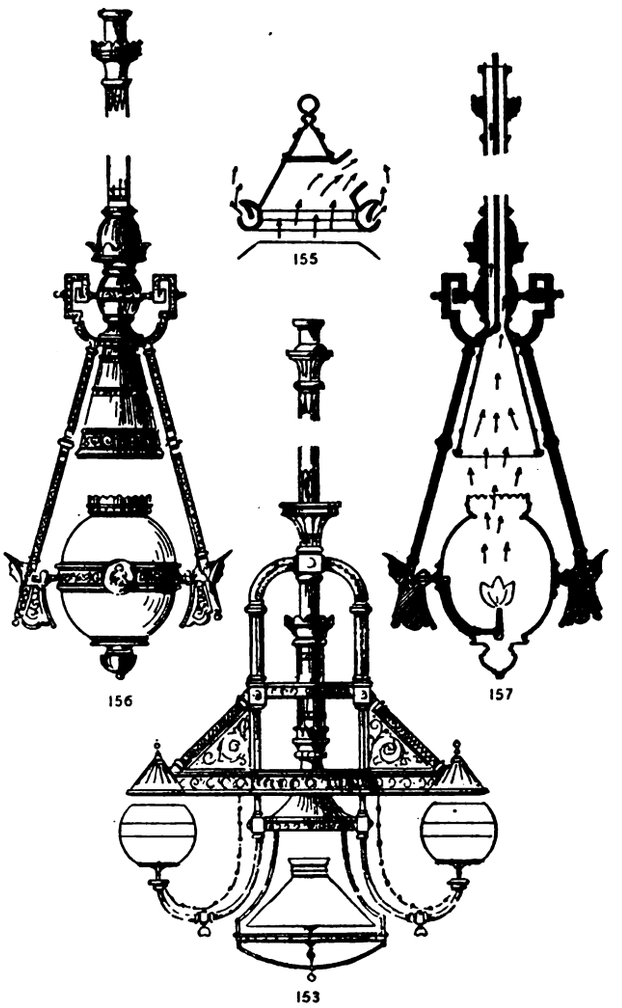
ing without ventilating the room, and if it enter hot it would rise at once to the ceiling, wherever the inlet might be located. To serve for both, as for summer or winter use, as well as to avoid discharging



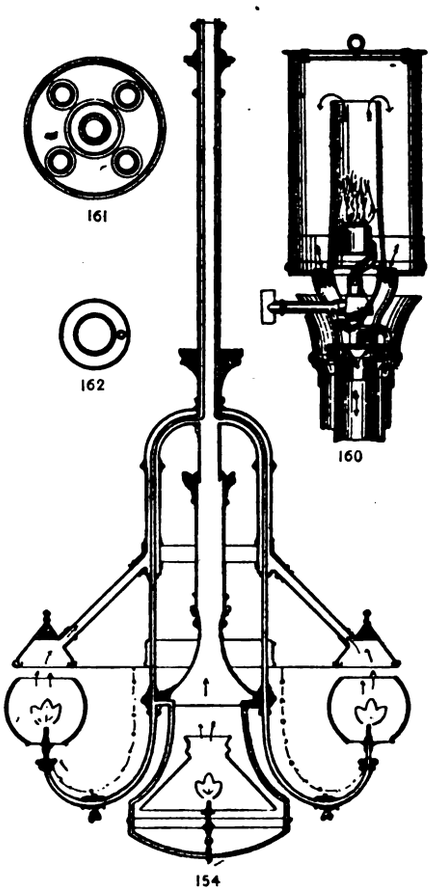
directly upon the occupants, it must be at the ceiling. To prevent contamination of this air by the gas-burners, it is necessary that the products of combustion should be removed at once upon their generation *at the level of the burners*, by ventilating ducts connected with each burner. It is urged in objection to this, that the appearance of the ventilating ducts would be unsightly, and that no one would consent to have so clumsy a contrivance in his house. But the space occupied by the ventilating flues need be no greater than that ordinarily taken up in the designs of gas-fixtures by meaningless scrolls and hollow casings applied solely for the purpose of increasing the apparent weight and size of the pipe and improving its contour.



Figs. 149 to 157 represent ventilating chandeliers designed by the writer. The first two are for the Adams Nervine Hospital, now being built by him at Jamaica Plain. Fig. 149 is for the dining-room, having eight globes surrounding a central reflector. A section of this chandelier is given in Fig. 151. A bell is formed over the central burner, from which ascends the main ventilating flue enclosing the gas supply pipe. Another bell encircles this, and carries off the gas products from the eight globe burners. Eight branch flues, one over each burner, connect this bell with the main ventilating flue. The branch flues are double, as protection against heat. The diameter of the inner branch flues is three centimeters each, the outer coverings are four centimeters, that of the main flue eight centimeters.



It is important that the flues should be only large enough to carry off the products of gas-combustion, and no more: otherwise the warm air of the room will be carried off with it and wasted. The lower rim of each bell is provided with a small gutter to catch the pure return water of condensation. Fig. 152 gives a section of the parlor chandelier, where each bell is separate from the rest. In this six burners are used. The flues are of the same size as in the dining-room chandelier. Both of these designs are kept very simple, in accordance with the instructions of the building-committee. Fig. 153 gives a somewhat more elaborate design for a small chandelier with two burners and a reflector. This is shown in section in Fig. 154. Fig. 155 gives the bell in detail with the condensation gutter. Figs. 156 and 157 give a view and section of a hall pendant. These designs are intended to be



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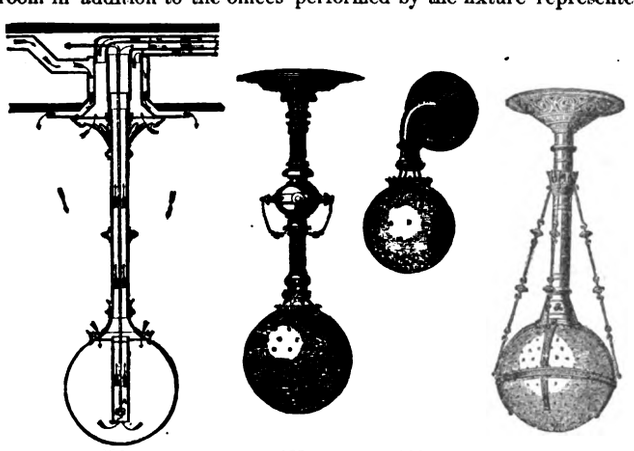
executed in brass, fire-gilt. The bells are to have an inner lining of sheet-iron, with an air-space between it and the brass-work, for the free passage of cool air, to prevent the brass-work from becoming discolored by heat. Or the bells may be made of annealed glass.

Figs. 158 and 159 represent an old form of ventilating burner, invented by Faraday in 1840, applying the descending draught and the argand burner with chimney and globe. The glass-holder is made to carry a second chimney larger than the first, and closed at the top with a double cover of mica. The air to supply the burner enters below the flame, through the two triangular spaces of the holder shown in Fig. 159, feeds the flame as it rises in the inside chimney, and then passes down between the two chimneys, and escapes through the exhaust flue attached to the bottom of the outer chimney and holder, as shown by the arrows. The usual form of globe may be used over the whole, or a special form of globe constructed for the purpose, with the top closed, may be adopted as in the figure. If the exhaust-tube connects with a cold flue, it is necessary to heat the ascending part in order to produce an initial draught. Fig. 160 represents the same device under a somewhat modified form. The fresh air has free access to the inner chimney from below, and returns after supporting the combustion through four branches uniting into one exhaust tube, connected with the space between the two chimneys. The plan of these four branch exhaust-tubes is given in Fig. 161, and the plan of the main exhaust-tube below, with the envelope surrounding it for ornament, is given in Fig. 162.

This system has been applied in France to the foot-lights of theatres. It has the advantage of lessening the chances of fire catching the dresses of the actors, as well as of maintaining the purity of the air of the stage, — a consideration of peculiar importance for actors and singers, the products of gas-combustion being particularly injurious to the throat and lungs.

Another form of ventilating gas-burner, now much used in England, is shown in Fig. 163. The air enters below the globe, and passes out above and also at the ceiling. This exhaust at the ceiling should be closed for the reasons already given, only the lower opening being used. Fig. 164 gives an arrangement for supplying fresh air to the room in addition to the offices performed by the fixture represented



164 165 166 167

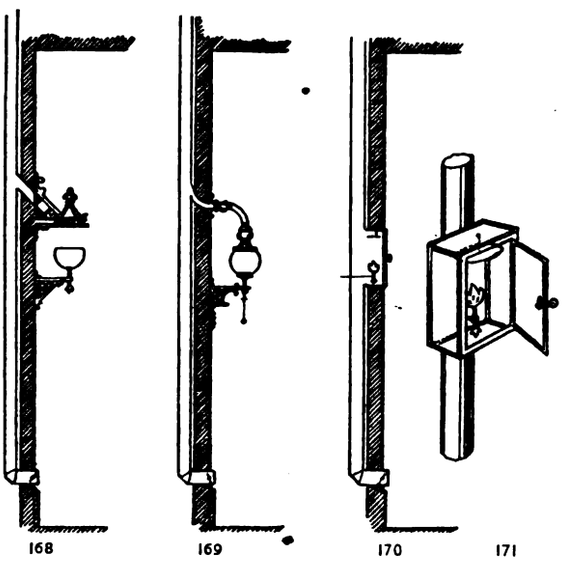
by Fig. 163. Figs. 165, 166, and 167 give various forms of the same device. In London at the present time ventilating chandeliers are used very largely in public buildings. These were originally made in the form of a vast bell or hood, covering the entire chandelier or crown of lights. But by this arrangement a strong shadow was cast on the ceiling by the cover. The inconvenience was remedied by using mica slate, instead of opaque material, in the construction of the bell, the sheets of mica being supported in an open-work metallic frame.

For the single burners of the Adams Hospital, the writer has had constructed a form of ventilator shown in Fig. 168. A little bell is placed over the burner, and connected by means of a small tube about five centimeters in diameter, with a larger flue, ten centimeters in diameter, descending to the floor. The large flue is provided with a damper near the floor, by means of which the ventilation produced by the heat of the burner may be controlled. The bell and small pipe are double, to prevent injury by heat.

Another form, represented in Fig. 169, he has designed for and used in a private dwelling-house, now nearly completed, on Dartmouth Street, Boston. In this, a glass globe is used over the burner, and the hood is brought down to the globe, and may be bent down so as to come in contact with it, or it may be slightly raised so as to leave a very small space above the globe for the admission of air. The effect of this arrangement is quite pleasing. The surface of the globe may be ground, cut, or colored to represent the petals of a hanging flower, the ventilating tube being the stem. The gas in this case is lighted by electricity. Still another and simpler form is given in Fig. 170. This he adopted to ventilate a number of bath and toilet rooms, in a house built in Salem in 1879. It consists of a square glass box, Fig. 171, connected with the main ventilating flue in each room to be ventilated, and holding the burner. The supply of air in this case comes entirely from the lower opening. To avoid flickering, the box must be brought forward in such a manner that the current of air passes by without striking the flame.

"The existence of sulphur compounds in burning gas is to be regretted as a nearly unavoidable evil; the only remedy seems to be the discharge of the products of combustion through chimneys or flues." — *Lincoln.*

According to E. S. Wood, "The sulphurous and sulphuric acids which are produced in burning, may injure delicate structures, such as books, gilding, silks, etc., that may be exposed to the air of a room in which gas is burned. Where large quantities of impure gas are burned, it causes a rapid destruction of textile fabrics, with a very acid condition of them. This was especially noticed in the large public libraries of London, many years ago; the covers of many of the books in the Athenæum Club-house, the College of Surgeons, and elsewhere, becoming destroyed by the sulphuric acid from the burning



168 169 170 171

gas. The amount of this acid was so great that it could be easily tasted by applying the exposed portions of the books to the tongue."

It is well known that the products of combustion of gas are highly injurious, and sometimes fatal, to flowers and plants. These rapidly fade in crowded ball-rooms, and plants growing in our houses for ornament become sickly and feeble where they are not protected from the corrosive influence of the acid gases.

"Nearly all of the sulphur is converted into sulphuric acid, which is a vapor readily condensed on the walls and other objects contained in a room. Gas not unfrequently contains 30 grains of sulphur per 100 cubic feet, which in burning gives rise to 90 grains of sulphuric acid; and this is the amount which would be produced by five four-foot burners during five hours." — *Lincoln.*

But besides carbonic and sulphuric acid gases, we have the dreaded carbonic oxide gas, which escapes into the room in considerable quantities (Parkes) whenever gas is partly burnt. This often happens with the varying pressure in the mains.

FOUNDATIONS IN COMPRESSIBLE SOILS.[1]

It is indispensable to a Chicago architect to have some knowledge of this kind of foundations; for if he has none, he is, as many have been, incompetent to erect large buildings with any kind of success. Chicago has neither rock, nor gravel, nor dry sand. The surface of the ground is level, the only elevation being a sort of slight dune on the shore of the lake, which rises about five feet above the ground on which the city is built.

The substratum throughout is a substantial bed of hard blue clay, which has a decided dip towards the lake, so that, while ordinarily from two to four feet below the surface, it is beyond ordinary reach on Wabash and Michigan Avenues, and all along the shore of the lake for a space of about 600 to 1,200 feet. Here the soil is a fine sand, pure or mixed with clay. The bed of the river is dug in the clay, and its level is about three feet below the original surface of the ground, which now is from six to eight feet below the level of the present streets.

Primitive Chicago was erected on this low and wet ground; and to keep the ground below the buildings dry, the principal streets were excavated with a dip toward the river. When, in 1856, the present system of sewers was begun, it became evident that the streets must be raised to prevent frost from injuring the sewers. This is the origin of the higher grades of streets which were adopted in 1857. Against my urgent solicitations, which were accompanied by a map, the streets in many parts of the town were laid too low, but were raised to a level with the higher streets, along and near the lake, after the great fire had destroyed the buildings.

With the exception of the old Tremont House, erected 1850–51, the construction of larger buildings began in 1852, shortly after the

[1] A paper by Mr. Frederick Baumann read at the last convention of the American Institute of Architects.

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time of opening the celebrated Lemont quarries, which afford us a dense limestone in blocks of almost any size and thickness. In 1853 I had charge of erecting the two tallest buildings in the city, both with fronts of the new Lemont stone. Knowing that the so-called "hard-pan" (surface stratum of the blue clay) was after all of but a yielding nature, I spread sand upon the clay, and laid thereon two courses of oak plank. The buildings showed no cracks, and were apparently sound; but it did not escape my observation that the corner-piers, particularly the lower part of them, had moved out of their vertical line. This circumstance at once changed my views, and when in the following year I erected a fine building for the (now defunct) Marine Bank, I constructed its foundations by the rule of independent piers, as I choose to call it: I estimated the weights of the different piers and masses of masonry, and laid the foundations accordingly. The result was satisfactory, so that I had no occasion ever to depart from this principle with a view to arriving at better results.

Having thus given a sort of history of the theory of foundations which prevails in Chicago, and which is treated in my pamphlet, I will proceed to this theory itself.

We all know that a piece of plank, of uniform density, floating on the surface of a body of still water will present a level plane. Now on loading this plank with a weight it will assume a dip — a departure from the level — unless this weight is so placed that its centre of gravity will be in a perpendicular line erected upon the centre of gravity of the plank. Shift the weight away from this centre, and the plank will assume a greater and greater dip, till at last the load will slide off. We all know this: it is self-evident, and needs no further proof.

Now let us assume in the place of this water any building ground, be it mire, quicksand, clay, loam, sand, gravel, rock. Let us further assume, in the place of this plank and the weight thereon, the base of a foundation with the masonry upon it, and the question is whether the case has become a different one. There is as, everybody will perceive, but one answer to this question: The case is precisely the same, for we know that matter, of whatsoever kind or nature, is compressible. The hardest rock is in fact compressed by the slightest weight, though in a degree infinitesimally small. But in practice, particularly in building-practice, we have no dealings with magnitudes of infinitesimal character. We deal with magnitudes which we can measure with very common instruments, such as rules, plumb-lines, and spirit-levels. What therefore we pronounce plumb, level, and of this or that dimension, is really only approximately so. We pronounce a building mechanically perfect in case its horizontal lines are nearly level, and its vertical lines nearly plumb. In this condition a building may justly be pronounced mechanically perfect, for it presents this appearance to our senses.

Considering in this practical light the strata of soil upon which we have to erect our buildings, we pronounce rock (of sufficient density and thickness) incompressible, gravel almost incompressible, and dry sand very slightly compressible. Any ground of this sort may be treated at random without visible hurt to the structure thereon erected. We may cover it with a uniform stratum of concrete, put thereon the bases without much calculating, and the result will be a good one. Thus it occurs that the plain laws of nature may be left unattended to and unobserved, without harm.

The case, however, is different when buildings are to be erected upon loam, clay, or mire. Here the law of nature makes itself dominant. The weights must be correctly estimated, and foundations made in proportion. More than this: the centre of gravity of the pier estimated must be put in perpendicular line over the centre of gravity of the foundation. Concrete can not here be put over the ground at random, though it might be put advantageously upon proper places. The softer the ground, the more correctly must be made the estimation and distribution of weights. The same is the case with buildings whose foundations are but narrow in proportion to the weights thereon placed.

At first sight it would appear, that the width of foundations is of little account so long as the distributing of weights is very correctly done. It would seem then, that, the only effect of narrower bases would be a comparatively deeper sinking of the structure.

This, however, is not, and can not be, precisely the case. When we go beyond a proper measure in this direction, we shall not see our building settle with exact uniformity. There are three reasons for this fact: —

First. It is practically impossible to make an exact distribution of parts and estimate their weights with sufficient accuracy. Many buildings are very complicated, and what is worst with them is, that many, oftentimes very heavy, parts of the structure do not enter during the process of erecting, but are applied afterwards. Interior columns, for instance, might receive but one-fourth of their load during construction and three-fourths after the roof is finished.

Second. It is not correct to assume that ground of uniform appearance is precisely of uniform density, nor is it safe in extreme cases to assume a uniform appearance. We are dealing here, in the best cases, with an approximation, and where we meet with palpable diversity in this direction, we shall find ourselves constrained to let the differences of density enter into our calculations. What then we shall arrive at will, in the happiest cases, be but an approximation, of a nature somewhat vague. Such exceptional cases, however, are not of frequent occurrence; there are none in Chicago.

Third. Compressible soil is not precisely compressed in proportion to the weight thereon placed, nor is it certain that different areas of the same soil suffer exactly the same compression, though proportionately loaded.

If, for instance, the ultimate compression of ground under a base four feet square is 1 1-2 inches when permanently loaded by a weight of 24 tons, it does not follow that a weight of 48 tons would cause a depression of 3, and 72 tons one of 4 1-2 inches. Here the facts have been, as I have had the opportunity of observing, that greater weights cause a proportionately greater depression. A 4 x 4 foot stone, loaded with what I estimated at about 64 tons, went down about 4 inches during the construction of the building; at the time of occupation the parts were made level by placing an iron block of 4 inches thickness under the column; but some two years afterwards the point showed again a depression of about 4 inches. Again the level lines were restored. Yet when I last saw the place a few months before the great fire, and probably seven years after the construction of the building, it appeared to me again 4 inches depressed. Many other similar cases I could mention were it necessary.

It would in the same way appear to me, that areas of great difference in size are not compressed exactly as the ratio of weights thereon placed. A base 4 x 4 feet loaded with a weight of 24 tons will receive an ultimate depression of 1 1-2 inches, when properly placed upon our "hard-pan," but it would always seem to me that bases of smaller area were more, those of larger areas less, depressed. I am not aware that this point has ever been brought to a proper test, and therefore abstain from being very positive on it. After the great fire I undertook to urge upon our Board of Public Works the importance of making proper tests, on all the various points, upon the Court House Square, but without success.

These foregoing three reasons will suffice to teach us, if our good sense did not, that under any circumstances it is best to allow the smallest possible weight of superstructure to the unit-measure of base. Thus if it were possible in a case to load the square foot of base with only a quarter of a ton weight of superstructure, there would be a very slight depression of the ground, such as would hardly be at all noticed. In practice, however, it rarely occurs that such broad distribution of bases is possible, nor would it be necessary to incur the larger expense therewith connected. It is practicable to arrive at a very perfect construction with a ton of superstructure upon a square foot of base, and this measure is now pretty generally taken. We have become a little more lavish in this respect, and disliking to take 1 1-2 tons, when the extent of ground permits us as well to take only one ton, we make the bases fifty per cent broader. Still, if it must be, we take the 1 1-2 tons and even more. The City part of our new Court-House is, if my information is correct, calculated for 2 1-2 tons upon the square foot of base. The result will show how proper or improper this is.

I hold to the belief that here in Chicago, where the ground is of so limited density, it is not good practice to construct buildings so massive that their foundations can not be spread out enough to limit the load to 1 1-2 tons upon the square foot. I believe it to be better, if the height can not be kept down, to construct lighter walls, purposely so light, that the prescribed limit of weight will be kept. A building with dropping keystones, broken lintels, cracked walls, is, after all, but little better than a wreck, and no precaution should be spared to avoid such occurrences.

The U. S. Custom House, so extensively mentioned in my pamphlet, is now receiving its plastering. Its foundations are concrete and dimension-stone thereon. The first warning as to its safety was given three years ago by the winter's frost which had been carelessly allowed to reach the ground below the concrete. The walls were subsequently constructed lighter, yet the results of constructing its foundations contrary to the common-sense rules laid down in this paper, are very plain to the passer-by. Keystones have dropped, lintels and arches are broken; corners are deviating from the plumb-lines: all of which defects would not be there, had the concrete been omitted, in its character of an "equalizer," and foundations been laid strictly in accordance with the common-sense rules laid down in my pamphlet and here briefly and independently repeated.

Frederick Bauman.

THE ILLUSTRATIONS.

DWELLING-HOUSE FOR E. TORREY, ESQ., DORCHESTER, MASS. MESSRS. CABOT AND CHANDLER, ARCHITECTS, BOSTON.

This house, now building, is on the corner of Melville Avenue, and Washington Street. The first story is to be of Roxbury-stone, the jambs and arches of Philadelphia moulded brick. Carved brick is to be used to some extent, as is seen on the large chimney in front. The second story will be of wood, and covered with cut shingles, while rough-cast plaster will form the panels in the gables. The inside finish of the first floor of the main house will be of quartered oak, with the exception of the sitting-room, which will be of cherry. The large stained-glass window, together with a carved brick fireplace in the hall, will form a prominent feature. It is expected that the house will be completed by the first of October. The contractors on the work are as follows: S. H. L. Pierce, carpenter; Horace James and James Driscoll, masons; Thomas Mahon, plumber; James F. Cleary, plasterer; and J. B. Hand, painter. The carving of both brick and woodwork will be done by John Evans, while the landscape-gardening is in the charge of Ernest W. Bowditch.

DETAILS OF THE SAME.

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RULES OF MEASUREMENT OF MASON-WORK IN CHICAGO.

We shall be pleased to receive criticisms of the following rules, the expression of a custom founded in equity, and prevailing in Chicago from its earliest days, which have been compiled by the "Chicago Masons' and Builders' Association."

If to furnish and lay one thousand brick in a plain dead wall costs ten dollars, another piece of brickwork of equal cost must be measured as of the same contents, even though it does not take one-fourth as many bricks.

The plain dead wall, in stone as well as brickwork, is taken as the standard, and the more difficult, complicated, ornamental, and hazardous kinds of work are measured up to it, so as to make the compensation equal. To illustrate: if in one day a man can lay two thousand bricks in a plain dead wall, and can lay only five hundred in a pier or arch in the same time, the cost of labor per M in such work is four times as much as in the wall, and he is entitled to extra compensation; but instead of varying the price, the custom varies the measurement to compensate for the difference, and thus endeavors to secure a uniform price per M for all descriptions of ordinary brickwork, instead of a different price for the execution of the various kinds of work.

This is the principle underlying the system.

If any new rules, or new applications of old rules, should be found in the following, we can only say in their recommendation, that we have carefully considered them in all their bearings, endeavoring to secure equal justice to owner as well as contractor, and that they will form the standard for deductions, as well as for compensation for extra work.

THE UNITS OF MEASUREMENT OF MASON'S WORK.

For excavation, the cubic yard; for concrete foundations, the cubic foot; for concrete floors, the superficial foot; for dimension-stone footings, the superficial foot; for dimension-stone bridge masonry, the cubic foot; for dimension-stone surface dressing, the superficial foot extra; for rubble-work, the cubic foot; for rubble-work surface dressing, the superficial foot extra; for brickwork, common, the one thousand brick; for brickwork, pressed, the superficial foot; for tuck-pointing, cleaning fronts, the superficial foot; for plastering plain surfaces, the superficial yard; for plastering cornices, the running and superficial foot.

EXCAVATION.

To be measured and computed by the actual amount of material displaced — no allowance for rehandling.

CONCRETE.

Foundations. Measure actual contents.

Floors to be measured by the superficial foot of surface between walls.

No deduction for tile drains; nor for any pier, chimney-breast, pilaster, or other projection of walls, of ten feet or less in area.

DIMENSION-STONE.

Footings to be measured each course separately. No deductions for drain or other openings under walls two feet or less in width.

Bridge masonry. Compute actual cubic contents.

Surface dressing of all kinds, extra.

RUBBLE-WORK.[1]

Footings[2] to be measured by actual cubic contents.

External walls. Girt building, and add thickness of wall for each external angle.

Intersections of partition-walls, two feet or less in width, to be measured double; if wider, add four cubic feet to actual contents of every intersection, for each foot in height.

For *each corner* of wall of more or less than ninety degrees, add one foot six inches to length of wall.

For *round walls* add one-fifth of length to girt measure.

All *projections* such as *chimney-breasts, piers connnected with walls*, and *pilasters*, to be measured actual cubic contents contained therein, and one cubic foot added thereto for each corner, for every foot in height.

Independent square piers to be measured by the same rule.

Polygonal and round pier work at special rates.

Recesses and slots to be measured solid, and in addition thereto allow one cubic foot for every foot in height.

Stone arches are classed as cut-stone work.

Deduct contents of window, door, and other openings, measuring from top of sill to spring of arch, and add two feet of wall for each jamb, for every foot in height of opening.

No deductions to be made for cut-stone trimmings and lintels.

BRICKWORK.[3]

Every superficial foot of "one-half brick (or four-inch) wall" to be estimated at seven and one-half bricks; of "one brick (or eight-inch) wall," at fifteen bricks; of "one and one-half brick, or (twelve-inch) wall," at twenty-two and one-half bricks; of "two brick (or sixteen-inch) wall," at thirty bricks, etc. Increase the number of bricks by seven and one-half for every additional half-brick in thickness of wall.

External walls. If sixteen inches thick or less, girt building, and add thickness of wall for each external angle.

When thicker, add to actual contents of each corner one and one-half cubic foot for every foot in height.

Allow for wall ends as for corners.

Round walls. Sixteen inches thick or less. For circular walls of radius sufficiently large to obviate the necessity of using specially moulded or cut brick, add one-fifth of length to girt.

When thicker, allow for sixteen inches of such wall, as per above rule, and measure all in excess as straight work.

Cut or moulded circular work at special rates.

Bevelled corners. For each corner of wall of more or less than ninety degrees, add one foot six inches to length of girt.

Partition-walls. Sixteen inches thick or less. Intersections of partition-walls (bonded together in any manner, not abutting) to be measured double.

When thicker, add one and one-half cubic foot to actual contents of every intersection, for each foot in height.

Partition-walls connecting with stone walls to be measured one foot into such wall.

Chimney-breasts and pilasters. All flues and hollows in chimneys, four feet and less in area, to be measured solid.

When larger, deduct one-half contents of flue.

For all chimney-breasts and pilasters add eight inches to face for each corner, and multiply length so obtained by width (projection).

Detached chimneys in buildings, and plain chimney-tops, to be measured solid, and one-half of one cubic foot to be added for each corner, for every foot in height.

Chimney-stacks at special rates.

When square, find cubic contents, measuring hollow walls solid, and deducting flue.

When round or octagon, take length of diameter for side, and measure as though it were square.

Independent piers to be measured like chimneys.

Hollow walls to be measured solid.

Stone fronts backed with brickwork. Deduct thickness of ashlar from width, and figure like ordinary walls.

Gables and wall-tops. Wherever clipping of brick is required, add to actual contents the length of line of clipping by one foot, by thickness of wall.

Cornices and belts. If of running courses only, multiply length by height (greatest girt, in and out), by greatest projection.

If enriched (by corbels, brackets, or panels), multiply other dimensions, as given, by greatest girt length.

Ledges. Multiply length by height by greatest projection.

Projections. All other projections, if of four inches or less, to be measured four inches; if above four inches and not exceeding eight inches, to be measured eight inches; if above eight inches and not exceeding twelve inches, to be measured twelve inches, etc.

Gauged work at special rates.

Openings. Openings to be measured from top of sill to spring of arch, and shortest distance between brick jambs for width.

No deductions to be made for openings of two feet six inches or less in width.

One-half of contents to be deducted of openings from two feet six inches to six feet in width.

For openings of more than six feet in width, allow one foot six inches by thickness of wall, by height, for each jamb.

Slots, panels, etc. No deductions to be made for slots, chases, niches, panels, or other recesses of four feet or less in width; if wider, deduct contents, and add two cubic feet of wall for every foot in height.

Trimmings. No deductions in measuring brickwork for cut-stone or other trimmings, bond-blocks, timbers, joists, or lintels.

Arches, not gauged.

In vaults, multiply length of chord at spring of arch by height from chord to extrados by thickness of arch.

In walls, find contents of arch by same rule, and add to wall measurement.

In sewers and tunnel-arches, multiply length of extrados by thickness of arch.

Floor-arches and brick-paving to be measured by the superficial foot, and by rule given for measuring concrete. Deduct well-holes.

Brick-nogging. Measure as ordinary brickwork. Deduct full openings — no studding.

Cutting in of joist and other holes, by the piece; of slots, panels, and recesses, by the lineal foot.

Toothing, etc. When ordered by owner or his superintendent to tooth, rack, or block, in consequence of delay of iron, stone, or other material, that mason-work may connect with, such toothing, racking, or blocking shall be measured as extra work, as follows: increase girt length of such line by one-half, and multiply by one foot, by thickness of wall.

PRESSED BRICKWORK.

Measure all exposed surfaces of brick by the superficial foot.

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[1] *Corner* is used for salient angles of wall, and *angle* for re-entering angles.

[2] Footings are all such foundation courses, not exceeding sixteen inches in height each, as are wider than the body of wall above.

[3] Different cities make different bricks; in reality the products of no two brickyards are entirely alike in size, nor, for that matter, are all bricks burned in the same kiln. The necessity of acknowledging some standard for purposes of mensuration and calculation is obvious. In these rules the dimensions of a brick are understood to be two by four by eight inches. We therefore speak of four-inch walls, meaning the width of one brick; of eight-inch walls, meaning the width of two bricks; and of twelve-inch walls, meaning the length of one and width of another brick, etc, — although the actual width of wall will be more or less in excess of these measures.

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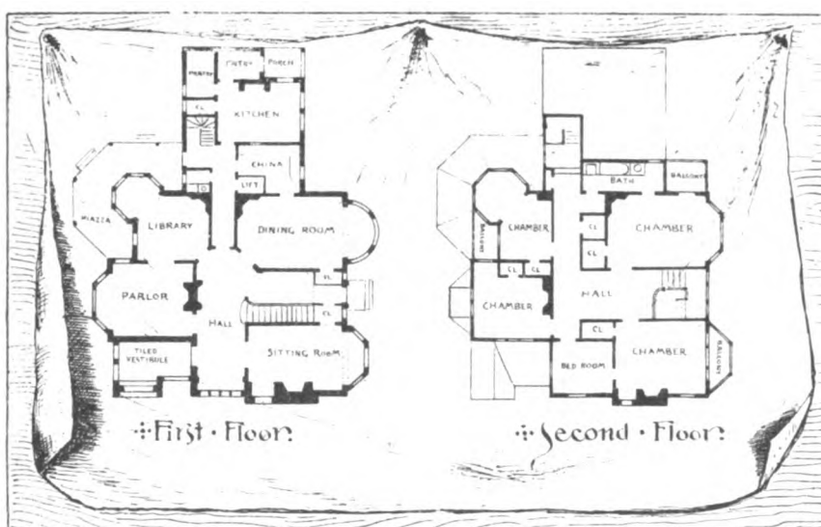

DESIGN of HOUSE:
For E. TORREY, Esq.
Corner Melville Ave and Washington St. Dorchester.
Cabot and Chandler Archts

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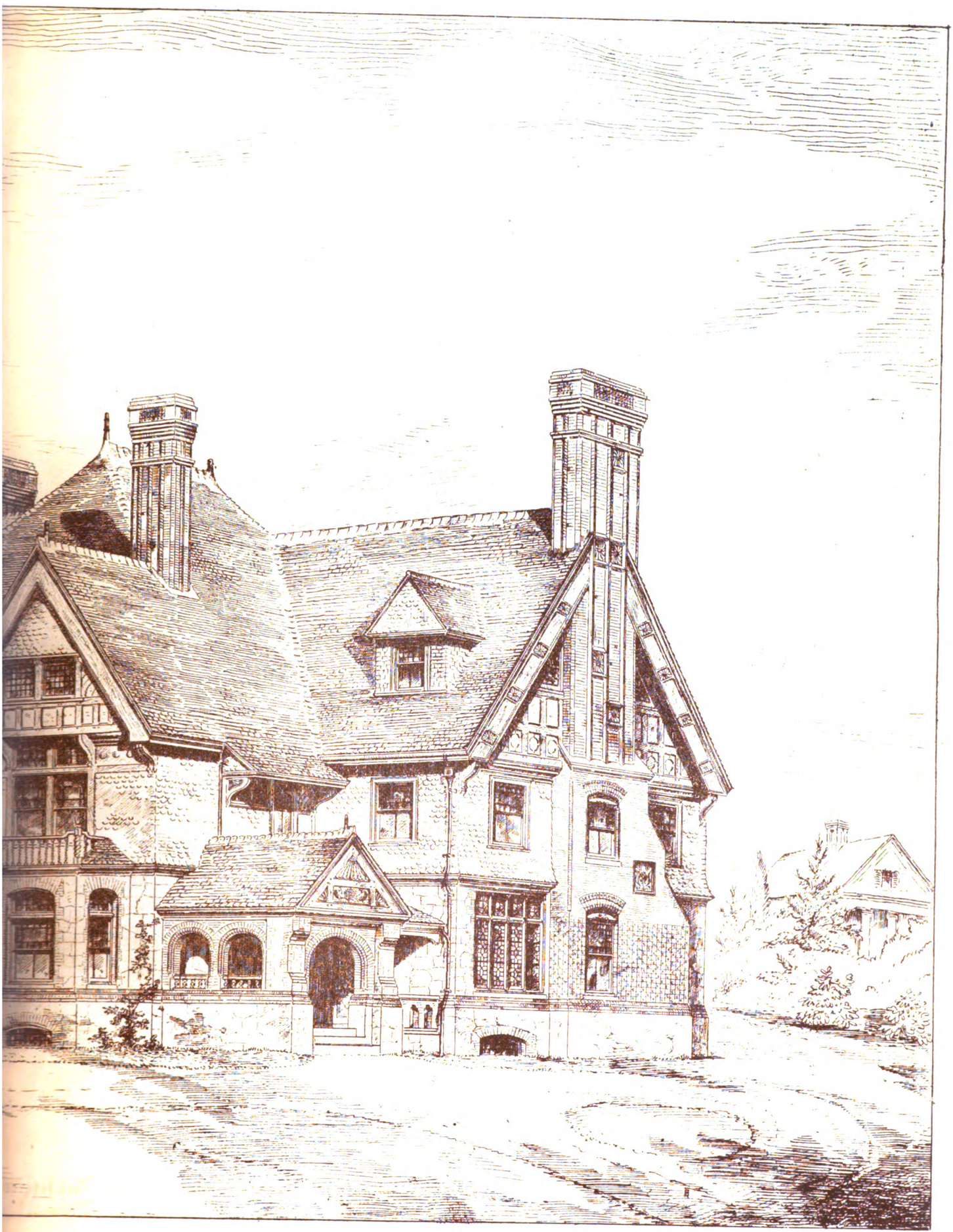

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CUT-STONE SETTING.

Measure vault-covers, flagging, curbing and ashlar by the superficial foot; coping and belt-courses, by the lineal foot; all other cut-stone by the cubic foot.

Tuck-pointing and cleaning and pointing stone-work to be measured by the superficial foot of exposed surfaces.

PLASTERING AND LATHING.

To be measured by the superficial yard — from floor to ceiling for walls, and from wall to wall for ceiling.

Corners, beads, etc. All corners, angles of more or less than ninety degrees, beads, quirks, rule-joints, and mouldings, to be measured by the lineal foot on their longest extension. Add one foot for each stop or miter.

Cornices. Length of cornices to be measured on walls.

Plain cornices, of two feet girt or less, to be measured on walls by the lineal foot.

Plain cornices, exceeding two feet girt, to be measured by the superficial foot.

Add one lineal foot by girt for each stop or miter.

Enriched cornices (cast work) by the lineal foot for each enrichment.

Arches, corbels, etc. Arches, corbels, brackets, rings, centre-pieces, pilasters, columns, capitals, bases, rosettes, bosses, pendants, and niches, by the piece.

Openings. Openings in plastering to be measured between grounds.

No deductions to be made for openings of two feet or less in width.

One-half of contents to be deducted for openings from two feet to six feet in width.

For openings of more than six feet in width, deduct contents of openings, and allow one foot six inches for each jamb, by height.

Deafening to be measured by the superficial yard, floor measure, between walls: take out well-holes.

THE ENTRESOL.

It is rather remarkable that so little has been done by the architects of commercial buildings with the entresol, but that all architecture or attempts at design are cut off at, and end with, the shop-window or its breastsummer. We seldom see the façade of a building devoted to business which does not affect the palace above the ground-story or shop-window. The shop-front must, as a *sine qua non*, be all plate-glass, while above it the building may assume the most monumental appearance of solidity, and bespeak at once the genteel residence of its occupant. The entresol, literally an inter-story, is the French word for mezzanine or middle story, but its proper meaning architecturally is that it should form a subordinate story within the larger or higher one. In the following remarks we desire simply to show its proper place as an architectural feature. Many of our recent buildings in the City, where this feature is employed, show a decided misapplication of it; and their architects appear to have adopted a common French expedient of pronouncing the mezzanine between strongly expressed horizontal features, as cornices and balconies, the effect of which is to cut up and destroy the unity of the composition.

One of the usual modes with us of making an entresol is by forming an arch above the shop-window, the effect of which arrangement is to unite the two openings and also to make the shop-cornice appear as a transom. This method is common in the United States, and we have several examples in leading thoroughfares in London. It may be seen in the Strand, in Cheapside, and the most recent instance of it we know is at the new Mercers' Hall, in Cheapside, where the architect has formed a series of flat elliptical arches springing from the piers, the general appearance of which is an arcade with a transom running through at the impost level. Of all usual arrangements this is probably as good and as architectural as any; but the difficulty is in treating the arch and making it unite agreeably with the upper stories. A semi-circular arch seldom so unites; there is a recent instance of this near Anderton's new hotel in Fleet Street. The semi-circular opening does not unite well with the upper part, and the shape of the arch itself has an unmeaning effect for the purpose of lighting. A segmental-headed opening is not open to this objection so much, but it always appears to want a good abutment at the sides, or a weak, unstable effect is produced; and another difficulty occurs in subdividing the opening for windows, and we have seldom seen, in either of these forms, any suitable filling-in for the glazing. It appears to us far better to abandon the idea of having one undivided opening under a single arch, and to arch it in three or more divisions, with small piers between, which would rest on the entablature, or be carried down the front below. With, say, three arches of segmental form, the elevation of the house is not increased; the mezzanine may be kept lower, and the architectural composition above not sacrificed. A horizontal line or cornice can be run through, above the arches, and the first story can be made to unite in a less awkward manner to the mezzanine. For the purpose of separating the mezzanine from the first story, a common mode is to have a bold cornice or a balcony of slight projection, as in the new premises in Ludgate Hill; but it is a mistake to mark distinctly the separation between the shop-windows and mezzanine. In a few examples this story is treated as a kind of attic to the lower order, with good effect. A still better arrangement is to make the entresol an integral part of the shop-front if the building is intended for commercial purposes; that is to say, to let the framework of the ground-story window run through, only marking the separation by a kind of transom. It is possible, in this manner, to make the entresol a transition between the shop-front and the more solid upper stories of the building. Square or straight heads are better than arches, and can be made to adapt themselves with more agreement to the composition above. They also agree better with the horizontal cornices, balconies, or other features that may be placed above them.

The Italian architects seemed to be alive to this arrangement for combining two stories, so that the windows, while appearing separated, were yet connected architecturally. We may mention the celebrated Pesaro Palace at Venice, where Longhena has shown how the mezzanine can be made to appear an intermediate story without destroying the unity or gradation of the composition above. The basement of that building (see Fergusson's Handbook of Modern Architecture) is an excellent study for architects. Its two central archways or entrances are made the key-note of the horizontal division, for the mouldings which form the imposts of the arches are continued through as a string-course, and divide the lower ground-story windows from those of the mezzanine. The vertical pilasters are carried directly over one another, as architraves, and connect the two openings, while both the ground story and entresol are comprised in the rusticated basement; the effect of which is to give a lofty solid base to the two stories of columns and arches above. A similar treatment is seen at the Tursi Doria Palace, Genoa, also illustrated by Fergusson. In Cornhill and the Poultry, two examples of the same principle may be seen applied to business architecture. The ground floor and mezzanine are united, and form one composition; the horizontal divisions are kept back from the front of the façade, and the effect is to give unity to the design. Architecturally, we think the design is always more satisfactory when the ground and mezzanine or inter-story are combined, and appear to form one part of the composition, than when the latter is cut off and is made to look like a low story between two lofty ones. What looks better than a wide façade, with broad piers or pilasters running up to the top of the entresol, the horizontal division or floor being marked by a bold interrupted entablature, or band of masonry? The piers are strengthened actually and visibly, while a certain dignity of effect is obtained. In Mr. Peebles's new business premises in Fleet Street, illustrated in our last volume, this kind of treatment is partly adopted; the entresol is divided from the shop-story, though it forms more distinctly a part of it than an upper story. In this case, however, we find the mezzanine windows are slightly canted in each division, making a kind of flat bay-window between the vertical pilasters. Strictly speaking, however, the entresol should always be treated in the manner we have indicated, and not affect a separate and intermediate story of low height. In a future paper we may illustrate these remarks by some recent examples, in which the entresol is made an element of considerable value in street frontages.—*The Building News.*

VANDALISM IN ITALY.

Mr. J. C. Robinson, an English authority on art, in a letter to the *London Times* says:—

"One of the chief treasures of the South Kensington sculpture collection is the 'Cantoria,' or marble singing-gallery, from Santa Maria Novella, at Florence. I obtained this noble work about the year 1860, under the following circumstances: Being then in Florence, busily occupied in my official task of gathering works of art for the Museum, then under my charge, I learned that it had been resolved to 'restore' Santa Maria Novella, and that the noble old conventual church, every part of which was previously well known to me, was shut up and given over to the tender mercies of an architect acting under the immediate direction of the monks. Nobody had any idea of what was going to be done, and no one was allowed to get inside to see. However, I found means to obtain access. When I did so, the sight was heart-rending: the glorious old church, rich in wonderful details, and to which clung a thousand memories, was literally a chaos, gutted and pulled to pieces from one end to the other. The central pavement, once one of the most interesting things in Italy, almost every stone being a beautiful sculptured and inscribed grave-slab, — the very pavement on which Boccaccio's ladies of the *Decameron* are imagined to have trod, — was torn up and condemned, and every footstep stirred up clouds of sacred dust of the thonsaud old Florentine worthies beneath. All around lay heaps of dismantled altars, stalls, and curious church-fittings, and among them the huge marble stones of the 'Cantoria.'

"I learned that it was actually intended to replace this latter splendid work with a new one of entirely different design in black stone! The thing seemed incredible, yet it was true; and this was the reason: It seems that the monks of Santa Maria Novella had suddenly been cursed with wealth. One of their number had inherited a considerable fortune, and the fatal idea occurred to him that the best thing he could do with it would be to 'restore' the church. Some demon, doubtless, whispered this terrible suggestion, and the same fiend must have prompted the architect who came forward to carry out the plan. This worthy persuaded the monks that it was necessary to make the church and its contents uniform in style. Now, Santa Maria Novella is a fourteenth-century building, and from the architect's point of view, of course, all after additions were to be transformed or done away with. This the misguided man actually carried out. The entire series

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of altars which lined the church on both sides, erected at various periods during the sixteenth and seventeenth centuries, some of them splendid specimens of carved and gilded woodwork, were all ruthlessly swept away. Fresh altars were erected in their place in Florentine black stone, rows of them all alike, solemn travesties of fourteenth-century Italian-Gothic, hideous and unsightly and utterly out of keeping with the great pictures which adorned the old altars, and were re-inserted in the modern structures. It would be tedious, however, to recount a tithe of the enormities committed; as regards the marble 'Cantoria,' the work of Baccio d'Agnolo, one of the greatest of the Florentine *quattro-cento* sculptors, and which is lauded as a famous masterpiece by Vasari, it was sold to this country for a sum amounting to not one-third of the cost of the hideous 'Gothic' stone gallery put up in its place. To crown all, the architect had the folly and stupidity, at the conclusion of the work, to publish a self-laudatory pamphlet descriptive of his labors.

"Comment on this lamentable story would be superfluous: things quite as bad have been done since; the only way to stop them is publicity. Italian newspapers would render true service if they would take the trouble to find out and denounce the innumerable acts of vandalism which are rapidly depriving their beautiful country of the evidences of its ancient glories, instead of abusing observant foreigners who call attention to the subject."

THE ST. GOTHARD TUNNEL.

The piercing of the longest tunnel in the world has been achieved in seven years and five months — a rapidity of execution quite unprecedented, for, relatively to its length, the St. Gothard has been bored in a fourth of the time occupied in the boring of the Hauenstein tunnel, and in less than half the time taken by the Mont Cenis. This great advance in the art of tunnel-driving is due to the more extended application of machinery, and above all to the efficiency of the air-compressors invented by Professor Colladen, of Geneva. The perforators, actuated by these compressors, do their work with marvellous swiftness. In two hours one machine drills 26 holes 1.20 metres deep in a face of rock some two metres square. The holes are then filled with dynamite, charged and fired, every explosion dislodging some 2.5 cubic metres of rock. The point of attack for the perforators is always the upper part of the finished tunnel of the future; the floor of the passage they clear out being afterwards blasted and wrought down by hand to the required level. The locomotives used in the tunnel are moved by compressed air, and ventilation is provided from the same source. Horses are also used for dragging the wagons, but owing to the intense heat and the closeness, the mortality among them is very great. Out of a stud of forty, ten die on an average every month. The men work night and day in shifts of eight hours each; the labor is very trying, and they are compelled to take frequent holidays. Great circumspection has had to be exercised in the admission of outsiders to the galleries, as a walk of several miles in the stifling heat and vitiated atmosphere might easily prove fatal to persons with weak hearts or a tendency to congestion of the brain, and even the healthy who venture in for the first time have often occasion to regret their temerity. The scene in the interior of the tunnel is weird in the extreme: the pitchy darkness, relieved only by the glare of a few lamps, the shrieking of locomotives, the blowing of horns, the tramp of horses, the vibration of the perforators, the explosion of mines, the continual passing of heavily-laden wagons, the groups of naked men plying pickaxe, spade, and shovel — all these things mingled together create an impression never to be forgotten.

The completion of the work, now that the two galleries are joined and a free circulation of air is established, will be comparatively easy. The tunnel is expected to be ready for traffic by the end of September; and the entire system of which it is the centre, in the summer of 1882. The great engineering triumph of which the St. Gothard Tunnel is at once the monument and the consummation, though a peaceful, has not been a bloodless one. Between sixty and seventy men have been killed by the premature explosion of mines, and other mishaps; many more have been seriously injured. — *London Times.*

SEWERAGE AT NEW ORLEANS.

[The following are the main portions of an address to the New Orleans Auxiliary Sanitary Association by Col. Geo. E. Waring, Jr.]

Looking at the main problem of sanitary improvement in New Orleans, it seems to me that when this surface cleansing shall have been secured, you must, before you cease from your labors, go deeper than the surface, and strive to secure those conditions which are recognized the world over as essential to safety.

Your difficulties are other and far greater than those of a high-lying town, built on a porous and well-drained site. Such a town has by nature most important conditions which you can secure only with the aid of art. Your city stands low down on the saturated alluvium of the Mississippi, and I am informed that your soil is water-logged to the very foundation of your houses. This condition is incompatible with even a tolerable preservation of the public health, and the great prominence of pulmonary, malarial, and diarrhœal diseases in your records of sickness and deaths sustains the accepted and proven theories on the subject. With a climate most favorable for pulmonary soundness, you have a death-rate from consumption which would appall even a New England doctor; the malarious tendencies of your climate are aggravated by the worst possible malarial condition of your soil; and domestic filth — the foster-mother of diarrhœal maladies — is here in no degree counteracted by soil conditions which elsewhere favor its harmless destruction.

Your chief problem can be very simply stated. What you need is a dry soil and a clean soil. The dejecta of human life must, so far as possible, be instantly removed — before their decomposition has begun, and the soil water which now fills your air with dampness and your ground with obstruction to its natural purifying functions, must be removed. In other words, before you can hope for the healthy condition which it is your right to demand, and which it is your duty to secure, you must have deep soil drainage and deep sewerage. I place them in the order of their importance, for soil drainage should take precedence of sewerage in your work, as much as consumption and malaria take precedence of zymotic diseases in your death-tables.

I cannot pretend, with only a few days' acquaintance with the locality, to prescribe the manner in which the improvement should be carried out. I can only suggest what general course I should advise, were the conditions to prove, on fuller examination, to be what they seem to be at a glance. The details of the scheme can be safely determined only by a very careful study of all the circumstances.

Suppose some such plan as this to be taken as a basis of arrangements of which the details should be worked out: —

At the lowest point in the general neighborhood of the Bienville draining-machine, establish two adjacent pump wells low enough to receive the outflow of subsoil drains and sewers, which should be at no point less than six feet deep. Let one of those wells receive the clean water of the subsoil drains, and the other the foul outflow of the sewers. Establish a pumping outlet from the latter to the Mississippi, and an outlet from the former into the canal which leads to the lake. Erect two pumping engines, either one of which would suffice in ordinary times to keep both wells pumped out, working alternately in both. In emergencies both pumps could be brought into requisition, and in case of accident to one the other could be made to do the full duty. Any means which would keep these wells empty would secure the same result as would the raising of the site of the city at least six feet above its present level. The wells would become effective low outlets for the entire low drainage.

The sewers should be adjusted to remove all of the foul sewage of the city, but none of its surface wash. The household waste which now makes your gutters so very foul should be withdrawn, but the clean water of your rains and of your flushing works should flow freely through them. The gutters of your cross streets are now seething with nastiness, and any plan for securing even tolerable sanitary reform must include their cleansing — not only by flushing where that is practicable, but more imperatively by keeping out of them the filth which they now receive.

The sewers being provided, their use should be compulsory, and the removal of every form of human waste quite into the Mississippi, within a few hours of its production, should be secured. Organic decomposition should be made obsolete anywhere within the city, and this implies the total abolition of all forms of vaults and cesspools and of all ingenious systems which include the retention of waste matters for a single day in the premises where they are produced.

The sewers should not be used as subsoil drains. If they are so constructed as to let soil-water in, they will let sewage water out. In connection with them, laid often in the same trench, but delivering always into the clean water well, there should be a series of permeable subsoil drains, to remove the water of saturation which now does you such vast injury.

By a proper application of the system here indicated, you will secure the dryness and the purity of the soil of the city which are so imperatively demanded.

It would be folly to attempt with the data in my possession to make even a guess as to the cost of this work, but any one who is conversant with sewerage operations must at once recognize the fact that it would be well within the means of the people to support it. Its maintenance and the interest on its cost would probably not exceed the present yearly outlay for emptying vaults alone.

It has been the custom hitherto for all sewerage work to be done by the public authorities. So long as the sewerage proper and the removal of storm-water are effected by the same system, this is necessary; but if we have to consider, as we surely ought to do here, the separate removal of the foul sewage, there is no reason why the work should not be done by private enterprise — paid by the persons served — as is the case with private water companies and gas companies. There will be no difficulty in securing capital for such an enterprise; if necessary, legislative authority can be had. The coming summer would suffice for the preliminary engineering, and between next October and June the whole city-built area of New Orleans could be completely drained and sewered.

When the time comes for it, the whole outlying area of the city can be drained by a separate system of deep open-ditch works, by the methods universal in Holland — the present canals serving for the outlets of this drainage.

The deeper drainage of these lands would have a very marked effect in increasing the salubrity of your climate, and its trifling cost would impose but a slight additional tax on land which is now of little value, and which would then become of the best agricultural character. This is a subject for future treatment, but it should be included as a possible element of the whole scheme.

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IMPROVEMENT OF THE BACK-BAY, BOSTON.

To the Editor of the American Architect:

Dear Sir,— My attention is called to an objection offered in your issue of 20th inst., to the plan for the improvement of the Back Bay now before the Boston City Council, and which, if the writer's assumptions were accepted, might stir up a strong property interest against it, and defeat the pending appropriation. As I had not thought it necessary to anticipate this objection in my report on the subject, quoted by the writer, you will kindly allow me to explain my neglect to do so.

The objection is that there must be a constant rapid deposit of filthy silt in the proposed Back-Bay basin, from the water supplied to it out of Charles River; that this silt will foul the shores, and fill up the channel from which it must be removed at frequent intervals by a very costly process and with great offence to all living in the vicinity. The objection is unsound for the following reasons:

In summer all the supply required from the Charles may be let in within an hour before and after high-water, and may be all drawn from within three feet of the surface. At and near the turn of flood, the river is without perceptible current, and the water within three feet or more of the surface carries no silting matter. I have observed it frequently, when, so far as the eye could detect, it was perfectly clear.

When, under extraordinary circumstances, the water is unusually turbid, it will be unnecessary to let it into the basin. The gates may be always closed against in-flow during stormy weather if it is thought desirable. In winter they may be closed for a month at a time without harm.

But it is urged that as population increases on its banks, the river will be increasingly dirty. Both the present city engineer and his predecessor in office, and the city superintendent of sewers, are of a different opinion. The completion of works now in progress is expected to relieve the river of Boston sewage; and, looking further ahead and beyond Boston, it is likely that other expedients will in time be adopted for maintaining it in tolerable cleanliness. In no probable event is it to be anticipated that the annual deposit of silt within the basin from tidal water will be more than a mere film, or that it will be offensive.

To obtain satisfactory results upon the Back-Bay without excessive expense, is a complicated problem. I acknowledge especially a certain degree of uncertainty as to what may be accomplished under the novel conditions proposed for the low ground, and I should be grateful for advice upon this point from any of your sea-coast readers, who may have had experience of approximately similar conditions. The descriptive terms of our language applicable to land subject to occasional overflow from the sea are unfortunately limited, and for want of better I spoke of that proposed to be formed in the Back-Bay as marshy and fenny. Your contributor's second objection to the commissioners' plan is based, however, upon a more restricted use of these terms than I had supposed to be necessary. There are many sea-coast nooks of Massachusetts Bay with wooded banks into which the tide occasionally rises, and which are commonly spoken of by country people as marshy, very different in character and appealing in a very different way to the imagination from the marsh which he assumes that I have had in view.

As to his somewhat authoritative assumption of the "unloveliness" of all possible marsh detail under the circumstances, you will pardon me for repeating the familiar words of the poet: —

> "Dear marshes! Vain to him the gift of sight,
> Who can not in their various incomes share."

Respectfully yours, Frederick Law Olmsted.

THE BACK-BAY PARK.

Boston, March 27, 1880.

To the Editor of the American Architect.

Dear Sir,— There is one serious drawback to Mr. Olmsted's plan of the park of which even your intelligent correspondent, in the Architect of the 20th, does not appear to have thought. The thirty acres of marsh will furnish such clouds of mosquitoes, of the peculiarly malignant type generated in such places, as will make the surrounding neighborhood a very uncomfortable place of residence during the better part of the year, and render a row in one of the "small omnibus boats" anything but a pleasure trip. This plague of mosquitoes is one of the Back-Bay nuisances that many who have residences there, and in the otherwise delightful neighboring district toward Longwood and Brookline, have hoped would be in a great degree abated by the new park and the filling of the surrounding lands for streets and buildings. But this plan seems likely to make perpetual, if not to increase the nuisance.

Very truly yours, W.

A WATER-CLOSET CASING.

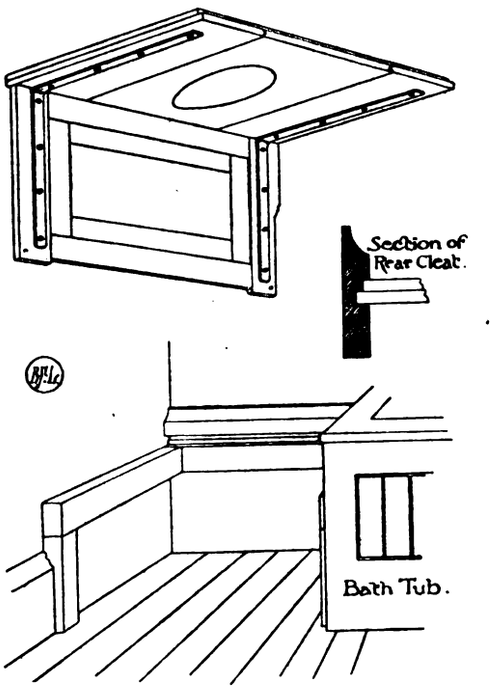
Philadelphia, March 6, 1880.

To the Editor of the American Architect:

Dear Sir, — The difficulty of reaching the apparatus within the water-closet without disfiguring the wood-work around it causes many householders to delay examination into its condition, when there are strong suspicions that repairs are much needed.

One objection to the present wood-work is, that it is composed of too many detached, or necessarily detachable, pieces; a second, that two visits from a carpenter are required to remove and replace these pieces with the least harm possible to their goodly appearance.

If the case is an urgent one, which it too often is likely to be, the work of removing the wood casing falls to the unskilled hands of the plumber, with considerable defacement of oak, walnut or mahogany, as the certain result.



I herewith send you a drawing of a seat *all in one piece*, which can be raised from its supporting cleats by simply loosening two screws at the base of the front vertical board. The horizontal and upright framed portions of the seat are held together by *two strong angular pieces of wrought-iron* screwed to the wood-work from the back; the screws not showing on the exposed face. The front panelled door, which should have hinges and a catch, you will notice is made so large that a complete examination of the interior of the closet may be made at any time. The back of the seat passes beneath the moulded portion of the rear cleat (see sectional drawing), and is thus held firmly in position. Also, the stiles of the vertical frame are lengthened a half or three-fourths of an inch, giving space below the lower rail for admittance of air. Ifthe room is covered with carpeting or oil-cloth, the seat may be removed, so that these may be placed beneath, and not against, the seat-front.

Hoping you may see fit to give publicity to the above, I remain,

Respectfully yours, B. Frank Leeds.

NOTES AND CLIPPINGS.

The Egyptian Workers in Glass. — A writer in the *University Magazine* says: On the walls of the Beni Hassan tombs, the figures of glass-blowers with blow-pipes, marvers, crucible and furnace still show as freshly as when placed there by the artists of Osirtasen I. some 3,500 years before the Christian era, and among countless other relics, such as vases, bottles, cups, and bugles, found in the valley of the Nile, a necklace bead discovered at Thebes bears the name of Queen Ramake, wife of Thothmes II., who reigned about the date of the Jewish exodus. In the sacred colleges of Thebes and Memphis the systematic pursuit of science and constant investigation of the mysteries of nature were objects of the closest attention. The colossal works of architecture and sculpture with which the country is studded could only have been executed by a people among whom the mechanical arts were highly advanced: and though the fragility of glass renders it especially liable to utter destruction, there exists ample evidence in the specimens now enshrined in our museums that its manufacture was carried out to a degree of perfection that modern science has hitherto vainly sought to rival. The glass works of Alexandria were especially renowned for their vases with blue and white grounds and festoons of colored glass, and their products were exported to Rome down to the days of Aurelian. Classic authors inform us that the Egyptians were famous in imitating gems in colored glass, and bracelets, earrings and trinkets of the purest gold set with these paste gems have been forthcoming to confirm this statement. Other specimens show that they could not only gild and engrave glass and fuse it into colored mosaics, but that they possessed the art of fusing gold in glass so as to unite, — an art until now looked upon as being as utterly lost as that of tempering copper to the hardness of the finest steel, which the Egyptians also practised. Hence glass thus instudded with granulated gold has been regarded hitherto as one of the rarest and most curious relics of antiquity.

Artesian Wells. — Messrs. Pevear & Co. have in successful operation, at their store on Boston Street, Lynn, Mass., a tubular well, two-inch pipe, with a capacity of twenty to twenty-five gallons per minute, or from 12,000 to 15,000 gallons per day. The well is thirty feet deep, the water soft and clear; temperature, 53 degrees. At Newhall & Co.'s, Myrtle Street, a similar well has been in operation seven years, producing 86,400 gallons per day. It is confidently asserted by some that Lynn's future water-supply will be obtained by similar means.

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The Last Great Fire in Japan. — The first detailed account received of the destructive fire which occurred at Tokio on the 26th of December, and by which over 260 persons lost their lives, is found in the Japan *Gazette*. "The fire broke out at twelve o'clock in the central part of the city, close to Nihonbashi. It was blowing a gale at the time, and within thirty minutes of the outbreak the city was on fire in seven different places; burning shingles were flying about as thick as hail, and were carried long distances by the wind, settling on other houses and setting fire to them. The scene is said to have been terrible. Strong men were running about in a state of bewilderment with old men, old women, and children on their backs; mothers dragging along their little ones, bent only on saving their lives. All day the fire raged with the utmost fury. The whole of the buildings on the island of Ishikawa, at the mouth of the Sumida River, including the dockyard and prison, were burned. So rapidly did the flames travel that it was with difficulty the streets were cleared of people before the houses ignited; and in so many places was the fire raging that they knew not which way to run. Anxious to save *futons* and wearing apparel, the poor creatures sallied forth from their homes with bundles on their shoulders to fly they knew not whither. The streets became blocked with the surging masses; women and children were trampled under foot, and many who fell in the crowd never rose again; little children were seen looking for their parents, parents looking for their children, while the air was rent with cries of rage, anguish, and despair. Still they clung tenaciously to the few worldly possessions they had succeeded in bringing from their burning homes, thereby almost completely blocking up the narrow streets through which the masses were slowly threading their way. At length the police interfered and caused numbers to throw their bundles into the rivers, or anywhere else out of the way, so as to facilitate the escape of the people from the frightful death which threatened them, and which was gaining on them fast. The native papers say that 68 streets, containing 13,464 houses, were burned, rendering over 40,000 persons homeless. A relief fund was started, towards which their Majesties the Emperor and Empress subscribed 2,000 yen each. Long before the fire reached the foreign settlement of Tsukiji, the residents felt anxious and began to pack up. But this appears to have been almost a needless task; for when the fire did reach them there was no one to be found to convey their goods and chattels away. Everything had been got ready for flight, but had to be left in the house, as no coolies were to be found willing to undertake the task of removing even the boxes of clothing.

Destruction of the Pyramids. — A correspondent of the *Egyptian Gazette* writes: "I have just returned from a most interesting series of excursions to the Pyramids. They were made from a dahabiah, and included visits to the great pyramids of Gheezeh, at Sakkarah, to Dashoor, and to Maydoon. I regret to say that in several places we observed the hand of the destroyer at work. Not only was this the case at a remote place like Dashoor, but, so to speak, under M. Mariette's very nose. Some four or five large stones, immediately under the entrance, have been removed from the Great Pyramid; and, incredible as it may seem, I was informed, on what seemed to me trustworthy authority, that this wanton act had been committed by order of the Khedive, the stone being required for the buildings of the new mosque which so greatly overshadows the beautiful mosque of Sultan Hassan. Few people would be sorry to see the hideous new building pulled down, but that the pyramid should be further destroyed to build it is one of the most singular examples of the 'revenge of time' I ever heard. It is well known that, beautiful as is the mosque of Sultan Hassan, we have it at the sacrifice of the Great Pyramid, which was pulled down to build it. That the Great Pyramid should, after the lapse of more than five centuries, be once more put under contribution, and that for the purpose of building a mosque which already, when only half finished, hides and dwarfs its older neighbor in a way almost destructive of the pleasure of looking at it, is, indeed, a noteworthy example of the vicissitudes of fate and the irony of history. When the Government itself sets an example of this kind, we are not surprised that it is promptly followed by meaner folk. At Dashoor, a place seldom visited by the tourists, and where consequently the marauder thought himself safe, three camels were during our stay being loaded with the square white limestones of the casing of the larger pyramid. Few of these stones remain. The upper part of the pyramid has long been stripped. But, in spite of the remonstrances of our party, and the threat, promptly carried out, of a complaint to the Government by letter, these few relics were being ruthlessly pulled away, every removal of a stone insuring the destruction of two or three of its neighbors. The adjoining pyramid, which is so conspicuous from Helouan, and so remarkable from being built in two different slopes, had till lately its casing nearly complete. This casing is of the greatest importance, for the alteration of the angle will almost disappear when it has been removed; and I regret to say, though I did not actually see the work in progress, there can be no doubt that here also the destroyer has been recently busy. Stones, loosened from the top of the building, have been rolled down the side, tearing and smashing the smooth surface. Three or four large stones have also been removed from below the entrance, which is now inaccessible without a ladder. It is in little-known places like Dashoor that such destruction as I describe is most easy to perpetrate and most difficult to prevent. But there cannot be much difficulty in watching the Great Pyramid of Gheezeh."

The New Perugino at London. — The fine example of Perugino purchased several months ago in Italy for $16,000, and detained there some time for want of a government license to leave the country, has reached London, and is now permanently lodged in the National Gallery. It is in an excellent state of preservation, and is believed to have been painted in the first decade of the sixteenth century. It comprises nearly life-size figures of the Virgin and Child, standing between St. Francis and St. Jerome, with two angels above flying with a crown, and is looked upon as a magnificent specimen of Umbrian art. In size it is about six feet square. For many years it belonged to the private gallery of a family in Perugia, and very little has been known of it.

Masonic Emblems in Egypt. — The Cairo correspondent of the *Herald* communicates by telegraph a fact which will revive in a still higher degree the interest excited among students of Egyptian mysteries two or three months ago by Lieutenant Commander Gorringe's discovery of Masonic emblems underneath the pedestal of the obelisk at Alexandria, destined for transportation to New York. Interesting and important as were the discoveries of Commander Gorringe and Dr. Fanton, they were not exhaustive; and the practised eye of another distinguished Masonic dignitary has just detected an additional series of emblems of a value and significance far greater and more unquestionable than those previously reported. Mr. S. A. Zola, Grand Commander and President of the Scotch Ancient and Accepted Masonic Rite for Egypt, and Egyptian ex-Grand Master of Symbolic Masonry, has just examined the foundations of the Alexandrian obelisk, and has discovered another series of stones which not only bear all the existing Masonic emblems, but furnish the key which has hitherto been lacking to explain the entire dimensions and proportions of what proves to have been an elaborate Masonic edifice, including the obelisk itself, the pedestal, the staircase, and the hidden foundations. Mr. Zola professes to be able by this discovery to throw a vivid light upon the ancient Egyptian origin of Masonic symbolism, hitherto so energetically disputed by many *savants;* and it is expected that the publication of his detailed drawings will finally settle more than one of the problems which lie at the very foundation not only of Masonry, but of the obscure and complicated religious system of the early Egyptians.

Mr. Ruskin's Sheffield Museum. — Mr. Ruskin's museum at Sheffield has become so crowded with art treasures, and the number of students has so increased, that a public subscription has been started to defray the cost of a new wing to the building. Mr. Ruskin has written a letter of thanks to the working men who opened the subscription list.

Art at Washington. — An art inconoclast, visiting Washington recently, proposes a government commission to condemn the statuary of that city and utilize it for art purposes, as old cannon are similarly used by the Government. Property owners are beginning to complain that the horses in bronze, called, for respectability's sake, equestrian statues, are an injury to the value of real estate, for houses that face these effigies are not as rentable as formerly. Even the average Democratic politician thinks that unless a good marble statue can be set up in the Capitol, the marble had better be used for building purposes, as there is quite enough now "running to waste" that ought to be utilized. What little there would be left of art, after a robust and faithful exercise of the functions of such a commission, could serve as a model and warning for the future.—*Boston Transcript.*

Buying Soldiers with Porcelain. — A paper has lately been discovered in the state archives of Saxony which contains some curious particulars concerning the corps long known in the Prussian service as the "porcelain regiment," and from which the present 1st Dragoons and the 3d, 4th, and 5th Regiments of Cuirassiers claim to have sprung. According to tradition, the regiment was bought by King Frederick of Prussia from the King of Poland for some costly porcelain vases; and the documents lately found in the Saxon archives show that substantially the tradition was correct. King Frederick William, it appears, possessed a number of very beautiful and precious specimens of porcelain, and an attempt was made by King August II., of Poland, who was also Elector of Saxony, to purchase some of these through an agent in Berlin. King Frederick William declined to sell any of his porcelain; but King August, knowing his royal brother's passion for soldiers, offered him 600 dragoons, without horses, arms, equipment, or officers, in exchange for certain pieces. The negotiations were carried on by Privy Councillor von Marschall on behalf of Prussia, and Lieutenant-General von Schmettau for King August, and ended in the transfer of the 600 dragoons to the King of Prussia, and of a number of the vases in the first place to Dresden, where some were added to the royal collection of china, and others were placed in the Johann Museum, where they are still distinguished as the "dragoon vases." The men were valued at twenty thalers each, and the whole regiment consequently at 12,000 thalers; while the porcelain given in exchange for them was considered to be worth considerably more, though it had been purchased by the deceased King Frederick I. for a smaller sum.

The Peabody Buildings in London. — The last annual report of the Peabody Fund in London shows that the original bequests, which aggregated $2,500,000, have been increased by rents and interest to more than $3,500,000, although by recent expenditures this amount has been cut down to about $2,750,000. For the erection of more "Peabody buildings" for homes for the poor, the trustees of the Fund have arranged for the purchase of an area of nine acres, at a cost of $500,000. The buildings which are to be erected will cost about $1,800,000; and as the trustees are not allowed to encroach upon the principal, they have obtained a loan of $1,500,000, at three and a half per cent. This loan will be wiped out in about twenty years by the income from the original fund, and then the charity will be self-sustaining. The present buildings accommodate nearly 10,000 people, and the buildings to be erected will hold as many more. The sanitary provisions of the buildings are excellent, as is attested by the fact that the death-rate in them is less than in the West End, the aristocratic section of London. The report shows that the magnificent gifts of George Peabody are being administered with singular prudence and sagacity.

A New Castellani Collection. — It is said that Alessandro Castellani has been very busy of late in out-of-the-way bric-á-brac shops in various Italian towns. He is said to have got together another collection nearly as good as the one offered to the Metropolitan Museum in New York. He asked for his first collection $150,000, and on selling it in Europe realized $80,000.

Sandy Hook Lighthouse. — The Sandy Hook lighthouse, which is 50 x 50 feet, and 60 feet high, is to be removed 700 feet from its present location, up a grade of 35 feet in the 700.

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BUILDING INTELLIGENCE.

[Reported for The American Architect and Building News].

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

224,625. STEAM-STOVE. — John Ashcroft, Brooklyn, N. Y. The object is to construct a stove for culinary purposes, operated by steam only, which shall be capable of accomplishing all the duties required of a kitchen-range, and so that the difficulties attendant upon the use of steam apparatus in the household may be mainly avoided. A represents the outer wall of

Fig. 1.

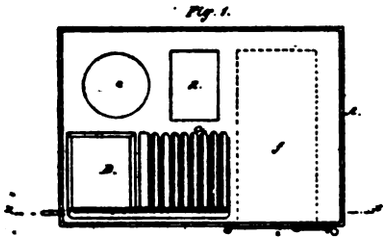
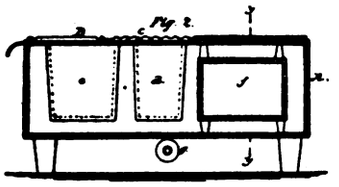
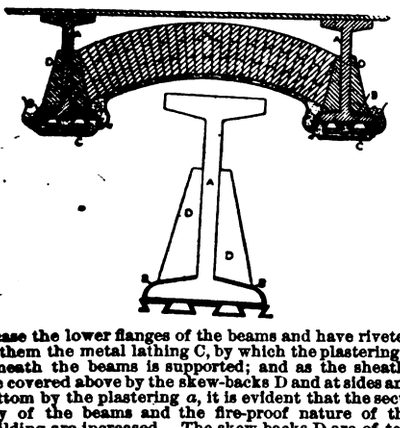


Fig. 2.



the stove, *d* and *e* are depressions in the top of A, which may be multiplied to any number, and may be of any shape, size, or depth, for any kind of cooking. B and C are sections of the top of the wall, A, or "stove," as it may be called, and are to be used for frying and broiling, and are inclined and provided with depressions to collect drippings from meats. C is corrugated, to be used as a broiler more particularly. *f* is an oven opening on the side of and inclosed in the wall A, and supported by lugs. This oven is closed by a door which may be either single or double. The steam-chamber is the space between the walls, A, and cooking-chambers *d*, *e*, and *f*, and is provided with suitable steam connections and traps for the introduction and escape of steam and water. This invention is intended especially for use in the household, where neither the knowledge nor skill required in the use of steam receptacles with joints can be found. Therefore the new apparatus is cast entire, the chamber, cooking receptacles, and broiler all in one piece, thus avoiding all joints, except where the necessary steam connections are made. In casting a dry sand core is made, and the casting is made, leaving a sufficient number of holes for the removal of the core, which holes are afterwards plugged up. The casting is of sufficient strength to resist any pressure required, and will be provided with steam-traps and safety-valves.

224,173. FIRE-PROOF BUILDING. — Joseph Gilbert, Philadelphia, Penn. A represents flanged beams of metal or wood. B represents sheaths of metal which



incase the lower flanges of the beams and have riveted to them the metal lathing C, by which the plastering *a* beneath the beams is supported; and as the sheaths are covered above by the skew-backs D and at sides and bottom by the plastering *a*, it is evident that the security of the beams and the fire-proof nature of the building are increased. The skew-backs D are of terra-cotta. The lathing C is bent into dove-tail grooves, which offer an effective key to the plaster and securely sustain it.

225,680. SCREEN-DOOR. — Joseph Barkheimer, Des Moines, Iowa.

225,682. COMBINED DRILL AND BIT-STOCK. — Seymour A. Bostwick, Chelsea, Mass.

225,684. EAVES-TROUGH HANGER. — August H. Braunlich, Ida, N. Y.

225,704. SAFETY-DEVICE FOR WINDOWS. — R. D. Henrense, New York, N. Y.

225,707. LATCH.—Thomas S. Livermore, Leicester, Mass.

225,720. EXPANDING-DRILL. — Levi F. Pond, Ludlow, Mass.

225,725. CURTAIN-FIXTURES. — Francis B. Scott, Buffalo, N. Y.

225,728. LATCH. — Charles H. Smith, New Britain, Conn.

225,732. CRAYON-SHARPENER. — John Suter, New York, N. Y.

225,733. SHEET-METAL ROOF.—Raymond G. Sykes, Niles, O.

225,761. RATCHET-REGULATOR FOR TRANSOMS, ETC. John T. Donohue, New York, N. Y.

225,768. BIT-BRACE.—Nelson Spofford, Haverhill, Mass.

225,776. VALVE FOR SEWER-TRAPS, ETC.—William Wilson, Oakland, Cal.

225,795. SAW.—Amos A. Burr, Rockdale, N. Y.

225,808. LOCK.—Alonzo E. Deitz, Brooklyn, N. Y.

225,822. ARTIFICIAL WOOD.—William Grossmann, Chesterfield County, Va.

225,831. STEP-LADDER.—James Hill, Wilkesbarre, Penn.

225,837. ILLUMINATING ROOFING-PLATE. — Jacob Jacobs, New York, N. Y.

225,842. DISINFECTING-DEVICE FOR URINALS, ETC. Edward J. Mallett, Jr., New York, N. Y.

225,847. DOOR.—John F. Martin, Chicago, Ill.

225,850. SEWAGE TRANSPORTATION TANK. — Reuben A. McCauley, Baltimore, Md.

225,851. COMBINED STEAM AND HYDRAULIC ELEVATOR.—James R. McPherson, Beloit, Wis.

225,857. CURTAIN-ROLLER.—Walter B. Noyes, Boston, Mass.

225,860. AUTOMATIC PAPER-HANGER. — Robert R. Pattison, Terre Haute, Ind.

225,868. TOOL-HANDLE.—Jacob H. Richardson and John C. Calhoun, Oakley, La.

225,877. WINDOW-CORNICE.—James R. Shackleton, Brooklyn, N. Y.

225,902. DRILL-CHUCK.—Richard E. Wilcox, Hartford, Conn.

225,907. REGISTER-BORDER. — Albert H. Tingley, Providence, R. I.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS — The following building permits have been issued since the last report: —

Mrs. Ruth Taylor, three-st'y brick building, 62 Camden St.

D. M. Reese & Sons, two-st'y brick building, Fort Ave., between Burraugh and Ludlow Sts.

Hanover Street M. E. Church, additional story to church, cor. Hanover and Hamburg Sts., and three-st'y brick parsonage on Hamburg St.

S. L. Rhodes, two-st'y brick building, No. 1 South Charles St.

Adam Laner, two-st'y brick building, Herbert St., between Raison and Marriott Sts.

Charles Masson, 16 two-st'y brick buildings, on Eagre St., between Woef and Washington Sts.

Henry Laudensack, a three-st'y brick building on Baltimore St., between High and Front Sts.

CORN AND FLOUR EXCHANGE. — At a meeting of the incorporators of the new Corn and Flour Exchange Building Company, the announcement was made that the full amount of the capital stock, $200,000, had been subscribed, and that everything was ready to complete the purchase of the site on Second Street.

WAREHOUSE. — The drawings for the new five-story warehouse for the Trustees of Johns Hopkins's Estate, which is to be built on Sharp Street, between German and Lombard Streets, are nearly completed. This building will measure 45 by 75 feet. The fronts will be of brick, with stone and terra-cotta finish. Cost, $60,000. Messrs. Dixon & Carson, are the architects.

Boston.

BUILDING PERMITS. — Since our last report the building permits granted are as follows: —

Brick. — 246 *Commonwealth Ave.*, 1 dwell., 26′ x 57′, three stories; Vinal & Dodge, builders; G. A. Avery, owner and architect.

262 *Commonwealth Ave.*, 1 dwell, 24′ x 60′; S. M. Shapleigh, owner and builder.

Second St., cor. P. &. E., for South Boston Horse R. R. Co., 1 stable, 152′ x 155′, two stories.

Wood. — *Emerson St.*, Ward 14, for Henry Southers, 4 dwells. 32′ x 35′; W. T. Eaton, builder.

Euclid St., Ward 24, for J. M. Pike, 1 dwell., 22′ x 28′; E. F. Brown, builder.

Dorchester Ave., cor Victoria St., 4 dwells., for D. H. & E. A. McKay, 22′ x 30′.

Devon St., Ward 25, for B. & A. R. R., 1 stable, 40′ x 100′; A. H. Glover, builder.

Taylor St., Ward 24, for Milton Ice Co., 1 ice-house, 30′ x 55′; J. A. Turner, builder.

Main St., cor. Winthrop, Ward 5, for H. H. Chandler, 1 dwell. 25′ x 69′, four stories; E. W. Archer, builder.

Brick Permits for March, 35.

Wood Permits for March, 65.

Repairs and alterations active.

The work is far ahead of the same period of the last three years.

CHURCH.—On Columbus Ave., near Berkeley, is to be built the "People's Church," adjoining the chapel of the same society. The materials for the exterior will be Roxbury stone and buff freestone. The auditorium, with the connecting chapel, will accommodate about 3,000. The building measures 100 by 120 feet. The cost of the building is to be about $50,000. Mr. J. H. Besarick, who won in the recent competition, is the architect.

Brooklyn.

BUILDING PERMITS. — *Clinton St.*, 1 one-st'y brick store, 25′ x 70′; owner, George Cunniff, 13 Clinton St.; architect, Thos. F. Houghton; builders, Philip Sullivan and Myron C. Rush.

Freeman St., cor. West St., 1 two-st'y brick machine shop, 100′ x 30′; owner, New York Dye Wood Extract & Chemical Co., 161 Front St., New York; masons, Barker & Berton.

Manhattan Ave., 1 three-st'y brick store and tenement, 25′ x 52′; cost, $5,500; owner, C. H. Lieber, 476 Manhattan Ave.; architect, James Mulhaul; builders, Jas. Rooney and James Doig, Jr.

Clason Ave., 1 three-st'y frame factory, 46′ x 42′; cost, $1,000; owner, A. Dugan, 999 Myrtle Ave.; architect, P. Concannon; builder, P. Sheridan.

Vernon Ave., No. 77, 1 two-st'y brown-stone dwell., 20′ x 42′; cost, $4,000; owner, Patrick Sheridan, 775 Myrtle Ave.; builders, Long & Barnes.

Tompkins Ave., No. 30, 1 three-st'y frame tenement, 20′ x 50′; cost, $3,400: owner, Chas. C. Wissel, 26 Tompkins Ave.; architect, J. Platte; builders, J. Fuchs and George Loefler.

Pacific St., 3 three-st'y brown-stone dwells., 19′ x 43′; owner, William Zeigler, 248 Quincy St.; builder, James A. Thompson.

Atlantic Ave., 1 two-st'y brick stable, 35′ x 40′; owner, G. L. Weed; architect, John Mumford; builder, Frederick Ashfield.

Joralemon St., No. 103, 1 four-st'y brown-stone tenement, 25′ x 60′; owner, Geo. W. Brown, 728 Fulton St.; architect, C. B. Sheldon; builders, Levi Brown and C. E. Cozzens.

Fulton St., 8 four-st'y brown-stone tenements, 20′ x 65′; owner, Geo. W. Brown, 728 Fulton St.; architect, C. B. Sheldon; builders, Levi Brown and C. E. Cozzens.

Herkimer St., 5 two-st'y frame dwells., 16′ x 36′; cost, each $1,000; owner and builder, William C. Spear, 410 Seventeenth St.; architect, N. Whipple.

Sixth Ave., cor. Lincoln Place, brick church, 87′ x 100; cost $25,565; owners, Trustees Sixth Avenue Baptist Church; architect, L. B. Valk; builders, E. D. & A. Harrison.

Chicago.

BUILDING PERMITS. — *Union St., No.* 161, two-st'y dwell., for C. Anderson; cost, $2,500.

Clark and Laselle, near Eugene, 13 two-st'y stone-front dwells., for O. O. Ostrom; cost, $65,000.

May, cor. Huron, church for Gethsemane Church; cost, $15,000.

Loomis, near Zion Place, two-st'y dwell., for A. Barton; cost, $3,500.

Emma St., No. 63, two-st'y store and hall, for E. Smrz; cost $6,000.

Lake Ave., near Thirtieth St., 8 two-st'y dwells., for G. R. Clarke; cost, $30,000.

Michigan Ave., near Twenty-ninth St., two-st'y dwell., for Mr. Gillette; cost, $18,000.

Market St., No. 210, repairs of Empire Warehouse; cost, $12,000.

West Lake St., No. 664, two-st'y store and dwell. for H. A. Goodrich; cost, $3,000.

Lincoln St., No. 207, three-st'y dwell. for H. Goaler; cost, $7,000.

Ohio St., No. 35, one-st'y box-factory, for David Goodwillie; cost, $12,500.

Michigan St., Nos. 104 to 110, five-st'y warehouse, for the Newburry estate; cost, $30,000.

Blue Island Ave., No. 303, three-st'y store and dwell., for G. A. Predeiva; cost, $8,000.

CITY-HALL. — Work on the City-Hall has been resumed.

Cincinnatti.

BUILDING PERMITS — The following permits have been issued by the Board of Public Works: —

H. Kohlbrand, alter and repair two-st'y brick, Nos. 462 and 464 Vine St.; cost, $1,200.

John H. Shawe, four-st'y brick, No. 355 Main St.; cost, $3,500.

W. H. Fitzgerald, repair two-st'y brick, northwest cor. Nineth and Vine Streets; cost, $2,000.

Conrad Kuhl, three-st'y brick, No. 747 Vine St.; cost, $4,000.

Frank Reichert, two-st'y brick, No. 800 Vine St.; cost, $3,000.

Ohio Safe and Lock Company, four-st'y brick, southwest corner Elm and Commerce Sts.; cost, $6,000.

John Krohme, three-and-a-half-st'y brick, west side of Linn, between Court and Clark Sts.; cost, $4,000.

Jas. Griffith & Sons, three-st'y brick, west side of Central Ave., between Fifth and Sixth Sts.; cost, $6,000.

Indianapolis.

CITY HALL.—The city-hall project is defeated for the present.

COLLEGE.—Mr. D. A. Bohlen is the architect of the new medical college.

HOUSES.—Mr. J. H. Stem, architect, is building, at a cost of $8,000, a house for L. Sohl.

Mr. C. A. Wallingford, architect, is building houses for J. W. Hadley and E. H. Mayo, which will cost $5,000 and $3,000 respectively; also one for W. T. Fenton, which will cost $3,000.

LIBRARY.—Mr. C. A. Wallingford is the architect of the new public library which is to cost $14,000.

OPERA HOUSE.—Mr. W. H. English is to build on the Governor's Circle a fine opera-house which will seat 3,000 persons. The architect is not yet appointed.

STATE HOUSE.—Mr. A. Shearer has been appointed by the state-house commissioners to carry out Mr. May's design.

New York.

BUILDING PERMITS. — *Spring St.*, cor. Sullivan, for J. Mohnmann, Mr. José, architect, a five-st'y brick tenement, 25′ x 67′: cost, $18,000.

One Hundred and Eighteenth St., for Mr. J. H. Hoffman, Chas. Baxter, architect, a four st'y brown-stone flat, 20′ x 72′; cost, $12,000.

First Ave., cor. of Eighty-seventh St., for Mr. H. & R. Johnson, A B. Ogden, architect, Jno. Cook, builder, 4 brick tenements, 122′ x 56′; cost, $30,000.

Eighty-seventh St., for Mr. H. & R. Johnson, A. B. Ogden, architect, Jno. Clark, builder, a four-st'y brick tenement, 27′ x 64′; cost, $9,000.

East Twenty-eighth St., Nos. 11 and 13, for the Rev. T. J. Dacy, L. J. O'Connor, architict, Wm. B. Pettit, builder, a church, Newark stone, 50′ x 98′9″; cost, $38,000.

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Kingsbridge Road, 500 feet west of Croton Aqueduct, for Mrs. C. L. Anthony, Mr. Jas. Stroud, architect, a frame dwell., 61′ x 54′; cost, $2,000; Messrs. Smith & Crane, contractors.

ALTERATIONS. — *Sixth Ave., No.* 347, a three-st'y brick extension, 20′ x 23′, new store front in first story; cost, $2,500; owner, C. Halbe; architects, Thom & Wilson; builder, Jacob Vix.

First Ave., No. 838, new store front in first story; cost, $1,500; owner, Frederick Butterfield; architect, Charles W. Romeyn; carpenter, George Riper.

William St., Nos. 123 *and* 125, a sixth story to be added; cost, $2,500; owner, Mrs. M. J. Pomeroy; mason, J. Allens; carpenters, R. Lambard & Co.

Forty-third St., W., No. 131, a brick school-house and dwell.; a fourth story to be built; cost, $1,300; owner, Joseph Blumenthal; builder, Lewis H. Williams.

Thirty-ninth St., E., No. 110, a two-st'y brick extension, 6′ x 13′, on rear; cost, $1,000; owner, E. L. Corning; mason, John M. Dodd, Jr.

Chambers St., Nos. 167 *and* 169, one-st'y brick extensions, 17′ x 32′, and 25′ x 32′, on rear; new store fronts in first story, and internal alterations; cost, each, $7,500; owner, Robert L. Stuart; carpenters, Havilah M. Smith & Son; mason, Richard Deeves; iron work, Althouse & Co.

Second Ave., cor. Sixth St., extension on rear, 10′3″ x 17′6″; cost, $2,000; owner, George Wilts.

West Broadway, No. 141, two-st'y part to be raised to four stories, and interior alterations; cost, $3,000; owner, Kinney Estate; architect, J. P. Lalley; builders, Giblin & Lyons.

West, cor. of Albany St., a store is to be remodelled, and made into a tenement-house, at a cost of about $3,000. Mr. Henry R. Searle is the achitect.

East Fiftieth St., No. 136, the building of Hook and Ladder Co. No. 2, is to be altered and repaired.

The Ridgewood house is to be altered and repaired under the direction of Mr. Henry R. Searle, architect, of New York.

FACTORY.—The site of the building lately destroyed by fire on Twenty-ninth street, corner of Seventh Avenue, is being cleared and a factory is to be built for occupation by the Domestic Sewing Machine Company.

HOSPITAL.—Mr. H. M. Congdon has drawn the plans for an addition to the St. Mary's Free Hospital for Children, No. 407 Thirty-fourth Street. It will be of brick, with stone finish, and will cost about $40,000. Messrs. Jeans & Taylor are the contractors.

HOUSES.—Estimates are now being received for the house for Mr. Robert Goelet, on the corner of Forty-Eighth street and Fifth Avenue. It will be very elaborate in construction and finish, the front of brownstone, and will cost about $225,000. The size is 100 by 80 feet. Mr. E. H. Kendall is the architect.

Mr. Ogden Goelet is to have a fine residence built on the corner of Forty-ninth street and Fihft-avenue.

ICE-HOUSE. — An ice-house, 100′ x 100′, is to be built at the foot of Sixtieth St., by Mr. Eastman.

MODEL TENEMENTS.—A block of model tenements is to be built on Twenty-third Street.

WAREHOUSE. — Mr. S. D. Hatch has drawn plans for a large warehouse to be built on Hudson street.

Philadelphia.

FACTORIES. — *Sargent St.*, cor. Emerald, 1 one-st'y picker house, 20′ x 36′, for James Meadowcroft & Sons.

North Twentieth St., Nos. 313 and 315, addition to mill of Jones, Evanson & Sons, 44′ x 48′.

North Fifth St., No. 1915, 1 two-st'y mill, 20′ x 46′; Charles Bossert, contractor; cost, $2,400.

Conestoga St., cor. Torr Ave., one-st'y factory, 40′ x 105′; P. H. Somerset, contractor.

HOTEL. — 919 *Wood St.*, 1 four-st'y hotel, 32′ x 40′; contractor, H. M.Martin.

HOUSES. — *George's Hill*, (Phila.), 1 three-st'y brick dwell. 30′ x 60′; Henry Rife, owner; Wilson Bros., & Co., architects.

Park St., north of Norris, 8 three-st'y dwells., 18′ x 60′; contractor, D. A. Cleaver; cost, $16,000.

Wharton, east of Nineteenth, 1 two-st'y dwell., 15′ x 44′; Thomas Marshall, owner and builder.

North Eleventh St., No. 1742, 1 three-st'y house, 26′ x 33,; owners and builders, L. Standacher & Son.

Cor. Twenty-first and Nichols Sts., 1 one-st'y storehouse, 37′ x 42′; contractor, W. J. Morse.

Hutton, cor. Forty-first, 1 three-st'y dwell., 32′ x 42′; contractor, J. F. Meyer.

Fourth St., cor. Huntington, 2 dwells. and 1 store, three stories, 20′ x 51′; owner and builder, Edward Donnelly.

Twenty-first St., cor. of Spruce, three-st'y dwell., 20′ x 70′; B. Ketcham & Co., contractors.

Palethorp St., North of Cumberland, 1 two-st'y dwell., 18′ x 28′; owner and builder.

LIBRARY. — *Twentieth St.*, south of Walnut St., a one-st'y library building, 20′ x 24′; J. H. Emickson, contractor.

STORES. — *Market St., No.* 814, 1 five-st'y iron and brick store, 40′ x 300′; owners, Young, Smith, Field & Co.; contract not awarded.

Thirteenth St., cor. Diamond, 1 three-st'y store, 20′ x 56′; contractor, William Bartholomew.

North Thirty-eighth St., No. 44, 1 three-st'y building, 20′ x 40′; E. W. Woolman, owner and builder.

St. Louis.

BUILDING PERMITS.—Forty-six permits have been issued since our last repott, seven of which are for frame structures of slight impotrance. Of the rest, those worth $2,500 and over are as follows:—

Owners.	Use.	Stories.	Rooms.	Cost.
John G. Weber,	Dwelling.	3	8	$ 3,500
Empire Building Co.	Theatre.	1	3	3,500
C. S. Greeley.	Warehouse.	4	4	40,000
J. Bastian and	Store and			
E. Langemann.	Dwelling.	2	10	5,000
Judge Ludley.	Dwelling.	3	10	6,000
C. Minges.	Dwelling.	2	16	5,000
A. S. Mermod.	Dwelling.	3	15	15,000
Lafayette Brew'g Co.	Brewery.	5	5	16,000
Anbenser Brew'g Co.	Malt House.	4	4	5,000
Rev. Wm. Fortens,	Church,	2	2	3,000

General Notes.

ATHOL, MASS. — The building fund of the Second Unitarian Society now amounts to $5,000.

ATLANTA, GA. — Messrs. Parkins & Bruce, architects, have the following work in hand: —

Fulton County Court-House; cost, $60,000.

House for Dr. A. W. Calhoun; cost, $8,000.

BENNINGTON STATION, MD. — Mr. C. E. Cassell, architect, of Baltimore, is preparing drawings for the new mission church, which is to measure 25 by 50 feet.

BIRMINGHAM, CONN.—Mr. C. B. Booth is about to build a fine frame house on the corner of Elizabeth and Cottage Streets. The plans are in the hands of Mr. C. T. Beardsley, Jr., architect.

BREWSTERS, N. Y. — Mr. Geo. Hines has plans ready for a frame house. Foster Bros., architects, of Danbury, Conn.

BROCKTON, MASS. — It is rumored that a new hotel is to be built here.

CAMBRIDGE, MASS.—Mr. J. H. Besarick of Boston is the architect of a family hotel to be built corner of Brattle and Spark street. It will form part of a scheme of five similar buildings enclosing a park. The hotel will be of brick, four stories high and will measure 46 by 58 feet. Mr. J. Brewster of Brewster, Bassett & Co. is the owner.

CLINTON, MASS. — Mr. G. W. Goss is to build a first-class house this season, from plans by Messrs. Barker & Nourse, of Worcester. Mr. H. G. Morse, of Fitchburg, is the contractor.

COOPERSTOWN, N. Y. — The corner-stone of the new court-house will be laid by the Freemasons, May 1.

DANBURY, CONN. — Mr. Delas Gregory is to build a frame house in Middle River district. Cost, $3,000. Foster Bros., architects.

Messrs. Beckerly & Co. are building three-story frame hat-factories, — one shop 140 by 30, one shop 90 by 30, one shop 60 by 30, one shop 90 by 26, one shop 44 by 50, and one shop 20 by 50. Cost, $20,000. Plans by Foster Bros.

Messrs. Gargen & Co. have just broken ground for a new hat shop here, 26 by 130, three stories; one shop, 40 by 60, two stories; one shop, 20 by 50, two stories; one shop, 20 by 60, W. W. Sunderland, architect.

Messrs. Foster Bros. have plans in hand for Mr. Brady, for a $2,000 frame house.

Messrs. Beckerly & Co. are about to build a two-story frame house on East Liberty Street. Plans by Foster Bros.

Mr. A. M. White, of 63 Broadway, New York, and and D. P. Nichols, of Danbury, are building a frame block, 51 by 60 feet, two stories, for stores and offices. Plans by W. W. Sunderland.

Mr. David McLean is building a frame house, costing about $4,500, from plans by W. W. Sunderland.

DAYTON, O. — The foundation of the Presbyterian church is completed, and the brickwork is progressing rapidly.

DETROIT, MICH. — The estimated cost of the hall to be built for the Saengerfest is $60,000. The hall will be ready for occupancy by the 15th of August next.

The congregation of B'nai Jacob has decided to build a synagogue, and has appointed a committee to procure a suitable site.

EASTON, MD. — Mr. Chas. D. Carson, architect, of Baltimore, is preparing drawings for a new three-story Masonic Hall, which is to be 40 by 40 feet, and will cost $8,000.

GLOVERSVILLE, N. Y. — An opera-house will be built here.

GREAT BARRINGTON, MASS. — Mr. J. L. Oberly, of New York, is commencing a new house a few miles out. Palliser, Palliser, & Co., architects, Bridgeport, Conn.

HOLYOKE, MASS. — The First Baptist Society has raised $6,000, for building a new church.

INDIANAPOLIS, IND. — The managers of the Orphans' Asylum have decided to build their new home this year, within the city limits.

KENT ISLAND, MD. — Christ Church is being rebuilt at a cost of about $3,000, under the charge of Mr. C. E. Cassell, architect, of Baltimore.

LABANON, O. — Prof. Holbrook will build a three-story boarding hall, on the corner East and Warren Streets, for the Normal School.

LAKE GEORGE, N. Y.—Mr. H. R. Searle of New York is drawing plans for three cottages, to be built here tels season.

LEAMINGTON, CAN. — Work on the new town-hall will be begun at once.

LITCHFIELD, CONN. — Miss Hattie Woodruff is building a frame house on North Street, three stories high, 40 by 60 feet, costing $7,000.

Mr P. H. Cummings is building a frame house on on West Street, costing $3,000. Robert W. Hill, of Waterbury, architect.

LOUISVILLE, KY.—S. Dinkelspiel & Son's three-story brick and stone store on Brook street; cost $5,000.

G. S. Spratt alters a three-story brick store and dwelling on the corner of Third and Walnut; cost, $4,600.

LOWELL, MASS. — Mr. Wm. H. Anderson is building a frame house and stable, Queen Anne style, in Belleview district, from plans by Robert W. Hill, of Waterbury, Conn.

MERIDEN, CONN. — Mr. W. W. Lyman, has just commenced to build a frame house house, — Queen Anne style. Cost, $18,000. Henry C. Morehouse, of New Haven, Conn., contractor.

Mr. Wilbur F. Davis, city attorney, is building a frame house on West Main Street. Cost, $10,000.

Mr. Geo. E. Savage has a frame residence nearly completed, costing $5,000. Brown & Stilson, of New Haven, Conn., architects for each of the above.

The Catholic society, Rev. Thos. Walsh, pastor, is building a convent school, of brick and brown-stone finish. Cost, $12,000. Brown & Stilson, architects, of New Haven, Conn.

MILFORD, MASS. — A stock company, with a capital of $300,000, is to build an opera-house here.

MONTGOMERY CITY, MD. — Christ Church, which is building under the charge of Mr. C. E. Cassell, architect, of Baltimore, will cost about $6,000.

MONTROSE, PA. — A. T. Cope, of Philadelphia, is building a quaint country house. Palliser, Palliser & Co., architects, Bridgeport Conn.

NASHUA, N. H. — Messrs. Dow & Wheeler, of Concord, N. H., are the architects of the station for the Concord Railroad which is to be built here this spring. It will be of brick and will measure 40 by 63 feet.

NAUGATUCK, CONN. — Messrs. Tuttle & Whittemore are building a foundry for malleable iron, of brick, 250 by 40 feet.

M. B. B. Tuttle is building a first-class house of pressed brick and Portland brown-stone finish, 60 by 84 feet, finished in hard woods.

Mr. Willard Hopkins is building a frame residence and stable on Hillside Avenue, costing $8,000. — Mr. Jas. O. May is also building a frame house on Hillside Avenue, costing $3,000.

Mr. Robert Hotchkiss is building a two-story frame cottage on Meadow Street, costing $2,500. Robert W. Hill, of Waterbury, architect.

NEW BRITAIN, CONN. — A brick school-house is being built, with Portland brown-stone finish, three stories, 93 by 51 feet, costing $10,000.

Mr. Henry Foulds is building a brick block, with Portland brown-stone finish, on Arch street, three stories, 30 by 60 feet, costing $6,000.

Messrs. Russell & Irwin are about building a block of brick, with Portland brown-stone finish, three stories, 83 by 80 feet. Robert W. Hills, of Waterbury, architect.

NEW HAVEN, CONN. — A new block of dwellings is to be built on Orange Street, by Dr. Henry Bronson. They will have pressed brick fronts and cost about $15,000. They will be three stories high. Brown & Clark, carpenters. E. H. Sperry, mason.

Mrs. Smith is building a house on Trumbull Street and Whitney Avenue, of brick and wood. Cost, $15,000. Brown & Stilson, architects.

Prof. A. C. Twining is building a frame house on Prospect Street, — Queen Anne style, — costing about $15,000. Brown & Stilson, architects.

Messrs. Brown & Stilson have also furnished plans for Mr. Max Adler, corner Hughes Place and Green Streets, costing $18,000.

NEWPORT, R. I. — The building committee of the Channing Memorial Church has voted to accept the designs for a church presented by E. Boyden & Son, of Worcester.

NOBLESVILLE, IND.—The architects of Messrs. Leonard & Wild's new store are Messrs. Huebner & Mueller of Indianapolis. The store will cost $8,000.

ORANGE, N. Y. — $3,000 have been subscribed toward the new depot at Brick Church Station.

PITTSFIELD, MASS. Mr. George H. Bliss is building a frame cottage, costing $6,000 from plans by Robert W. Hills, of Waterbury.

POINT OF ROCKS, MD. — A town-hall is being built.

PORTSMOUTH, N. H. — Mr. H. M. Congdon of New York is drawing plans for Christ church which is to be built from a bequest of the late Mr. Marsh, at a cost of $40,000. It will be of stone, in Gothic style.

PROVIDENCE, R. I. — Mr. Wm. A. Harris will make an addition to his works at the corner of Park and Promenade Streets, — a foundry, 110 by 160 feet, and a wing 130 by 161 feet. Plans prepared at the office of the works.

G. W. Chapin is putting up a tenement house on Aleppo Street. Cost, $2.000. Clifton A. Hall, architect.

READING, PA. — St. Joseph's Hospital is to be built immediately. The plans have just been adopted by a committee of physicians.

RICHMOND, VA. — The corner-stone of the new Jewish synagogue of the congregation Beth-Shaba, on Eleventh Street, was laid March 18.

A new church is to be built for the Oregon Hill Methodist Society.

RIVERDON, N. J. — Mr. J. K. Boyer, of Philadelphia, will build at once a frame country house, in Queen Anne style, with tower. Cost, $6,000. Palliser, Palliser & Co., architects, Bridgeport, Conn.

ROME, GA. — Messrs. Parkins & Bruce, architects, of Atlanta, Ga.. are building for Col. D. S. Printrip a house which will cost $10,000, and a house for H. B. Parks, Esq. Cost, $4,000.

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THE well-named Metropolitan Museum of Art in New York has been finally opened to the public in its permanent quarters in the Central Park. The building is as yet only a fraction of what it is intended to be, and the same may be said of the collections which it shelters, but both have made a noble beginning, and both are sure to grow, with a rapidity of which there are now perhaps few indications. It does not yet appear, — perhaps no one has thought much about that point, — whether the future Museum is to be a collection pure and simple, like the British Museum and the Louvre, existing for its own sake; in other words, playing the part of a great and powerful dilettante, and a means of special study for scholars; or whether, like South Kensington, it is to be primarily an educational institution, embracing a great variety of artistic work, with the object of illustrating the whole field of art rather than of securing certain unapproachable treasures; in the same way that a good teacher with limited means would collect for his pupils as wide a range of examples as he could, instead of consulting his own selfish vanity by spending all his resources on one or two rarities, good for little but to excite the envy of his personal competitors. There is much to be said for either theory of administration. We have not forgotten Mr. Ruskin's savage attack on South Kensington and its pupils, who "saw everything and did everything, and misunderstood all that they saw, and misapplied all that they did," and no doubt there is a certain point to the sarcasm; but it is impossible, knowing the work which South Kensington has tried to do, to compare the "art manufactures," to use an unpleasant phrase, which were shown in the great Exhibition of 1851, with those that England now produces, without acknowledging its extraordinary influence and success. If South Kensington, with the help of its little band of enthusiastic and persistent teachers, to whom it owes more than it does to the lavish generosity of the Government, could accomplish so much for the comparatively inartistic and lymphatic English, we may expect a great deal in eager and impressible America, from the powerful stimulus of great central museums organized on a like plan as to form, with their subsidiary collections, efficient instruments in the hands of men who knew how to use them. The Kensingtonian influence and methods, however, have quite a sufficient foothold in the country; and what we may call the commercial culture of art, to which they tend, is sure to be looked out for. So that we are more anxious to see provision made for the special studies which the beginnings of the Metropolitan Museum seem to encourage, and in which Americans are most backward.

THE project for a World's Fair in New York in 1883 seems to gain strength. The passage by the Senate of Mr. Kernan's bill authorizing the formation of the corporation which is to carry it out is a decided step in advance, and the omens may be said to be in every way favorable. With the help of the energy and good judgment which characterized the Centennial exhibition, the new one would have even a greater prospect of success. The rank of New York as the centre of foreign commerce would perhaps enable it to draw from other countries exhibits rivalling those magnificent ones which gave such brilliancy to the Philadelphia fair, and at the present rate of internal development our own country will have much to show that will be new and interesting. The telephone, the phonograph, the electric light, the luminous paint, have all received their principal development within four years, and scores of new industries are talked of on all sides. The progress of manufacture, in the making of pottery, tiles and terra-cotta, for instance, has been no less than astonishing. Three years more will witness the substantial growth of many others. One enterprise, which has already attracted some attention, and which architects could do much to promote, is the proper exhibition of American building-materials. A correspondent in our issue of two weeks ago gives some interesting information in regard to certain stones, and such information, disseminated with the help of collections of specimens in a great exhibition, would be of great use to architects, besides being the means of increasing general prosperity, by originating new industries in regions whose mineral wealth now lies unnoticed underground. It is singular, to say the least, that we should, with our vast deposits of marble of all kinds, be obliged to continue importing from Italy great amounts of that material, and that out of the great variety of figured marbles which are used for fine work but half a dozen, and those the least beautiful, should be home products.

AFTER so many years of poverty and depression, the "knights of labor," "sons of toil," or whatever else they may be pleased to call themselves, seem to be having their day again. The first week in April has seen a general advance in wages almost everywhere. The piano-makers, after the successful issue of their contest with their employers, stipulated that their return to work should be put off for another day, in order that they might celebrate the joyful occasion by a picnic and ball. Whether these festivities were paid for out of the funds contributed by sympathizing fellow-workmen in other cities for the support of their families, or whether the masters were compelled to foot the bills, we do not hear. Mr. Steinway, however, contributed fifty dollars, and was invited to share the hospitality of his men. We are very ready to congratulate the workmen on any real improvement in their condition, believing that their prosperity is a guaranty for the prosperity of all; but when, after weeks of idleness, their victory is secure, and their work is waiting for them on their own terms, for men to throw away wantonly the earnings of a day, which they owe to their wives and families, still more to squander the money which other men have taken from their own living to relieve their fancied necessities, on "festivities," is a folly that leads to a diminishing respect for those who seem to have so little care for either their duties or their interests.

A VERY interesting report has been made to the Commissioners of the New York State Survey, by their special agents, Mr. Frederick Law Olmsted and Professor James T. Gardner, Director of the Survey, on the project, to which we have before called attention, for reserving an international park around the Falls of Niagara. The report, as presented to the Legislature, describes in detail their scheme for reclaiming the river banks above and below the Falls, removing the buildings and planting trees, so as to bring the place as far as possible back to its original condition. A large proportion of the buildings are miserable sheds, and the expense would not be very great. Bath Island, in the midst of the rapids, which is now nearly covered with the unsightly buildings of a paper-mill, would be cleared and replanted with trees, and a strip of land, varying from one hundred to eight hundred feet wide, would be acquired along the brink of the stream, all buildings on it torn down, and the whole restored, so far as possible, to a state of nature. Certain water-privileges must be allowed to remain, but it will be possible to place the mills which depend upon them at some distance from the water, the wheels only being sunk in pits near the edge; and the owners express a willingness to do what they can to co-operate with the Commissioners. The whole territory to be acquired on the American side is but seventy-seven acres, — a trifle compared with the advantage of securing it. In the report, the feature of the original proposition, which was to make the reclamation of the region on both sides of the river an international matter, is not

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referred to, the suggestions of the Commissioners looking to independent action by the State of New York with regard only to its own side. This may be judicious. The Dominion is now committed to the restoration of the left bank, and if New York will take care of the right, the result will practically have been attained, without the delays, misunderstandings, and attempts at overreaching, which seem inseparable from mixed commissions.

Baltimore is running a race with New York in the matter of steam-heating, a large amount of pipe being ready to lay in the former city, so that when excavation is begun the work can go on rapidly. In order to prevent condensation of the steam in passing through the pipes, they are wrapped in rosin-sized paper and oakum, and jacketed with wood. The whole is tarred, but it looks as if the protection would be of a rather temporary character. The first lines are to be laid in Lexington and Charles Streets, which are closely packed with offices and stores, and form a favorable district for experimenting. Steam for cooking and motive purposes, as well as heating, will be furnished, and the company, it is said, guarantee that the cost will not exceed that of coal. We should, however, advise those who contract with the company to see that they get this guaranty in black and white. Baltimore is unusually well situated for such an enterprise; its compactness, and the steepness of its streets, compared with those of New York, affording facilities for easy distribution and also for the return of condensed water, which will, we think, be one of the most serious troubles.

One of the surprising things in the vital statistics, if we may call them so, of buildings, is the frequency with which court-houses are destroyed by fire. Not long ago we had to record the burning for the second time of a certain unfortunate example, and later despatches announce the destruction of the court-house and jail of Brown County, Texas, with the loss of several lives and the county records. How official carelessness can go so far as to intrust the records, on which depends the security of landed property, to an inflammable repository, we can hardly see. The requisite precautions for making a building reasonably fire-proof, — at least so much so that incendiary enterprises, such as this is said to have been, will have little chance of success, — cannot be difficult of attainment even in Texas, and a hole in the ground under the cellar floor, with a tin box set in it, would be better than nothing. We might say something in behalf of the helpless prisoners confined without means of escape; but so long as school-houses and tenement-houses remain what they are, it would be hopeless to urge the claims of criminals to a chance for their lives.

With the rapid extension of telephone communication, added to the ordinary growth of telegraphy in general, the business streets in our large cities have come to be filled at a certain level, with a maze of wires, whose presence is not always unobjectionable. In some cases it is said that chimneys have been overturned by the united strain of a number of tightly stretched wires fastened to them at an angle, and in certain recent fires the lines have been very seriously in the way of the ladders of the department, besides interfering with the fire-alarms by the crossing of the wires. Some steps have been taken toward the regulation of the lines, but except the efforts, which all parties are disposed to make, to avoid mutual injury as far as possible, nothing seems yet to have been done toward effectually remedying the evil. In Philadelphia, steps have been taken for compelling the laying of telegraph wires underground, and some of the telephone corporations propose to try subterranean lines.

There is some prospect of an interesting case being brought before the courts in Queen's County, N. Y. A certain drawbridge was to be built across the stream which bounds Long Island City on the south, and an engineer was employed to make plans, which were carried into execution under a contract in which the party of the second part agreed to keep the bridge in repair for one year after its completion. The contract also required that the plans and directions of the engineer should be implicitly followed, and that the material should be of good quality. Soon after the structure was finished, and before it was paid for, the draw, loaded with a team of horses and a wagon, fell into the stream. The city authorities thereupon called upon the contractor to rebuild it, which he declines to do and claims his pay as if nothing had happened, on the ground that the fall of the draw was the result of its improper design, with which he had nothing to do, and that having carried out exactly the instructions of the engineer, with good materials, he is only bound to make such minor repairs as every structure needs, not to stand surety for the engineer's mistakes. The case, so far as we can judge, much resembles that of Thorn *vs.* the Corporation of London, in which the contractors for the Blackfriars Bridge were compelled to incur heavy expenses through the defect or insufficiency of the plans and specifications furnished by the engineer, Mr. Cubitt. In the London case, the House of Lords decided that the Corporation did not warrant their engineer or his plans; that the contractors had as good an opportunity of judging of them as they had themselves, and that if they chose to sign the contract of which those plans and specifications formed a part, they could not look to the Corporation to make good their defects. Undoubtedly they would have had a good case against the engineer if he had shown want of reasonable skill or care; but Mr. Cubitt was dead, so that was out of the question. In the New York case, it is possible that some such action may be brought. If so, it will, we think, be the first one of the kind, and its conduct and decision will be of interest to all professional men.

Another law point has come up in Cincinnati. A certain owner of land on a steep grade, in laying his sidewalk, found it a saving of trouble to grade it at an inclination of one and one-half inches to the foot, the consequence being that when covered with ice it became difficult to stand or walk on. The city ordinance limits the slope of sidewalks to half an inch rise in every foot, and when a certain citizen, walking with due care upon this illegally steep grade, slipped and fell, and was thereby injured, he brought an action for damages against the proprietor of the land, together with the city. The city was dismissed from the case; we do not see why, since it ought to be held to some responsibility for seeing its own ordinances enforced; but the other defendant was held by the court to have constructively placed an obstruction in the highway, by heaping up his sidewalk in an unlawful manner, and therefore there was ground of action against him, as if he had put some actual obstacle in the path.

The stand in favor of professional self-respect in regard to competitions, which, as we mentioned in our last issue, has been taken by a large number of English architects, meets already with an encouraging response from the public. The government of the Birmingham Eye and Ear Hospital recently invited plans for remodelling their building, sending a simple note to six architects, asking if they were willing to prepare competitive plans. One of the invited ones had the public spirit to ascertain the names of the others, and invited them to a conference, at which a joint letter was drawn up, in which all concurred, suggesting that the Hospital authorities should, in arranging their proposed competition, make the following terms: that each architect should be informed of the names of all the other invited ones; that a professional referee be appointed, the competing architects to have a voice in his appointment; that the proposed outlay be stipulated, and any design to be ruled out whose cost would in the opinion of the referee exceed by ten per cent the allotted sum; that only eighth-scale geometrical drawings in India-ink be admitted, all to be under motto; that no drawings be received after a certain date; and that twenty-five guineas be paid to each unsuccessful competitor. The Hospital managers promptly acceded to all these suggestions except the second, that an expert referee should be appointed; but the invited architects representing the advantage of employing such an expert, both to secure fairness in the award, and to guide the Hospital authorities as to the practicability of the plans, they consented to this condition also, reserving only the right to modify the approved plan if they thought necessary. This is a gratifying transaction: the sooner architects make up their minds to stand before the public as educated and honorable men, exercising a profession second to none in the demand which it makes for talent, attainment, and business capacity, and not as envious and unprincipled sketchers, who are honored by being invited to send designs for buildings without the smallest chance of being paid for their trouble, the better off they will be, and the more the public will appreciate their services.

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A NEW EDITION OF REID ON CONCRETE.[1]

CONSIDERING the immense advances which have been made of late years, almost from month to month, in the knowledge and use of concrete, a new and enlarged edition of the standard text-book on the subject is now most opportune and welcome. Perhaps experiments in concrete construction are now the most interesting of all subjects to architects, who, however, have generally acquired, from the mysterious and disastrous failures of some of the experiments, a distrust of the new material, which they will be glad to have replaced by more definite knowledge of its properties — its limitations as well as its capabilities.

The author compliments the Americans highly on the intelligence and success with which they have pursued the manufacture of concrete and cement, saying that in what he calls the block-system of concrete building, as well as in the applications of the same treatment to the formation of small articles, pipes, vases and so on, they are far in advance of the English, from whom they took their first lessons.

Beginning the treatise by a discussion of the separate ingredients from which concrete is made, we meet with some interesting observations on the manufacture and testing of Portland cement, which forms the matrix of nearly all European concretes, and in regard to which Mr. Reid is undoubtedly the best living authority. After repeating that under the present careless and ignorant system of cement manufacture in England it is essential to test every barrel of the material which is delivered for use in important structures, he devotes a chapter to descriptions of the various testing machines, the principle of all of which is sufficiently familiar. Among other tests, however, is a very simple one, well suited to the wants of architects, who need only an approximate result, and cannot well afford the cost of expensive machines. This consists in mixing samples of pure cement with water, and pressing them into a mould 10 in. by 1½ in. by 1½ in. When set, which will be in one to six hours according to the character of the cement, the block is to be placed in water, where it remains seven days. At the end of that time it is taken out, and tried by placing it on supports 9½ inches apart, and gradually applying a load of 150 pounds at its centre. "If more than one out of three blocks are broken within one minute of the application of the load, the cement from which the sample is taken is to be at once rejected." The weight of 150 pounds so applied is equivalent to a tensile strain of 355 pounds per square inch of section, which would be a rather severe test for the Portland cement often used here; but the experiment is easily modified.

Another test which he insists upon at some length is the sifting of the cement. In his opinion it is uneconomical to use a cement of which at least 95 per cent will not pass through a sieve having 5,000 meshes to the square inch, for the reason that in a coarsely ground cement the larger particles act simply as sand, diminishing the effective portion of the cement, — that which is so finely ground as to be capable of coating the coarser particles to which it is added — by just so much.

The tensile test alone reveals nothing about the fineness of the grinding. On the contrary, the briquettes made from a coarse cement generally show a higher tensile strength than those of the same cement more finely ground, the coarser particles, like sand, actually strengthening the mass to some extent. When mixed with sand or gravel, however, the fine cement is far superior. In one remarkable series of tests, two samples of the same cement were tried, one ground to pass through 6,000 meshes per square inch, the other 32,000 meshes. The briquettes of the coarser cement, mixed neat and kept under water seven days, bore 833 pounds per square inch, while the finer cement broke at 617 pounds per square inch. With equal quantities of cement and sand, the tensile strength of the two samples was about equal; with two sand to one cement, the finer was 25 per cent stronger; and with 10 sand to one cement, the fine sample gave more than double the strength of the coarse, bearing 111 pounds to 53 for the latter, after seven days immersion.

These enormous tensile strengths, it should be remarked, were obtained with German Portland cement from the "Stern" cement works at Stettin, Pomerania, of whose quality Mr. Reid speaks in the highest praise, as is certainly natural. The illustration which the experiments give of the effect of fine grinding is most instructive.

After some remarks on the use of mixtures of different kinds of cement, or of Portland cement with lime, which he decidedly condemns, the author takes up aggregates, that is, the gravelly or stony constituents of concrete; then passes on to the concretes themselves.

Among his descriptions are some interesting ones of the American manufactures, in which he finds much to praise, and which are here generally known only in their results, the process, being little discussed. The well-known "Union stone" is, it appears, made with a peculiar cement, obtained by adding chloride of magnesium to oxide of magnesia, which is formed by calcining the native carbonate, or magnesite, found in various parts of the States. The mineral, after being calcined and ground, is mixed dry with sand, marble or soapstone powder, emery powder, or any similar substance, and then moistened with solution of chloride of magnesium, passed through a pug-mill, and then tamped into moulds. In three or four days the block is hard enough for use. The proportion of cement is very small, in some of the products only five per cent and the strength very great, considerably exceeding that obtained in a similar manner with Portland cement.

The once celebrated "Frear stone," made with sand, hydraulic cement and a solution of shellac, is mentioned, but with some expression of doubt as to the enduring quality of the shellac ingredient.

The remainder of the book is taken up with English concretes and artificial stones. Perhaps the most noticeable feature of the later processes is the extensive use of silicate of soda. Portland cement and crushed granite form the substance of the stone blocks, drain-pipes, or paving-slabs, but when hard enough to be handled they are placed in a bath of silicate, which does not appear to increase their ultimate hardness, but very much hastens the hardening action, so that the manufacturer can send off his goods in a few weeks after the order, without needing to carry an enormous stock, to allow the articles the necessary months or years needed for the gradual crystallization by the old methods.

This industry is rapidly assuming vast proportions in England. Beside the adaptations of concrete to floors, in which we keep even pace with our transatlantic cousins, there are found uses for the material in England yet untried here. One quotation will illustrate this, beside at once satisfying curiosity regarding a much-talked-of building, and awakening a still stronger desire to know more of the new world of construction of which the book gives us a glimpse.

All the architectural world remembers Mr. Norman Shaw's singular design for the Queen Anne house on the Rue des Nations at the Paris Exposition of 1878. Some had a vague idea that it was a concrete construction, but probably few understand exactly what that construction, now apparently well known in England as the "Lascelles system," consisted in.

To abridge the description as much as possible: the structure was framed of wood, precisely like our houses of timber, but the studs, instead of being enclosed with boards nailed to them, were clothed on the outside with slabs of concrete, one inch thick, screwed to them. The slabs were made beforehand, and shipped ready for screwing on.

But the most peculiar part of the description is yet to come. To all appearance, the house was built of very smooth and fine red brick, in old English bond, exquisitely rubbed and jointed. This was, however, only an appearance. The pretended bricks were really slips of a very fine concrete, colored red, one-quarter of an inch thick, 2¾ inches high, and 4½ or 9 inches long, according as they represented headers or stretchers, all stuck to the outside of the concrete slabs with Portland cement. As the author says, "the result is an external surface superior to any attainable through the agency of rubbed brick or terra-cotta."

That may be, and yet we are somewhat at a loss to understand why the Frenchmen should have made Mr. Lascelles a Chevalier of the Legion of Honor for such an invention. Perhaps, as Mark Twain says, "few escape that decoration," and Mr. Lascelles was not born to be one of the lucky ones.

[1] A Practical Treatise on Concrete, its Varities and Constructive Adaptation. By Henry Reid. New Edition. London and New York: E. & F. N. Spon, 1879.

ILLUSTRATIONS OF THE HISTORY OF ART.[1]

As the pen is mightier than the sword, to the student of art the pencil is mightier than the pen. But a student who wishes to have an illustrated record of his art often has to buy a great amount of descriptive text which he does not need, and so is able to secure fewer illustrations for his means with loss of usefulness to his library. The modern device of collecting and stringing on a new thread a collection of cuts originally made for various uses has been utilized to the relief of this difficulty by the well-known publisher, Seemann, of Leipsic, who has collected from existing works illustrations which form a consecutive history of art, including architecture, in parts which have from time to time found their way to this country. Lately Messrs. L. Prang & Co., of Boston, have been publishing an authorized American edition under the editorship of Mr. S. R. Koehler, and it will no longer be so difficult to answer the common question, Where can I find an illustration of this or that well-known building? It will be fairly safe to refer the questioner to this atlas of the history of art; for although the illustrations are drawn chiefly from the works of Kugler, Lübke, Burckhardt, Overbeck, Dohme, C. von Lützow, Falke, Woltman, etc., which, by the very large number of German buildings that are illustrated, gives a decided German flavor to the whole work, the range of subjects is large, and in certain directions the collection is fairly complete. At all events, it is such a collection as has not as yet its parallel, and, although the American edition is somewhat more costly than the original, it is not too high-priced for purchase by a student of art and architecture. It is, moreover, such a work as even those who have no desire to read or study may find pleasure in, especially if they have travelled with observing eyes.

The idea is so good that it is strange that it has never before been carried out, but it is a pity that both the original and the reproduction should have stopped so far short of their possibilities. The limitations, however, are probably inevitable in a project whose execution depends rather on what can be found ready to the hand, than on what is to be desired; and it is a remarkable witness to the abun-

[1] Illustrations of the History of Art, Architecture, Sculpture, and the Industrial Arts among the Nations of Antiquity. A Series of Illustrations chronologically arranged, and forming an Atlas to be used with any Work on the History of Art. Authorized American edition, published under the supervision of Mr. S. R. Koehler. Boston: L. Prang & Co., 1879. Parts I., II., III., IV. Price $1.50, $2.25, $2.00, $1.75.

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dance of fair illustrations of almost everything in our day, that a publisher should have been able to lay his hand on such a series of cuts as these. The *lacunæ* are particularly noticeable when the student, tolled on by the really satisfactory way in which ancient art has been represented, and by the full treatment of German and even Italian art, looks for a similar abundance of French, English and Spanish examples, and finds that of the great English cathedrals, York, Lincoln, Lichfield and St. Paul's alone are shown in exterior views, while only some half-dozen of the others are represented by a plan, a bay, or some detached piece of detail; while no cathedral save St. Paul's is shown in plan and elevation. France and Spain are more fairly treated.

The editor, evidently not an architect, seems to have confined his editorial functions to the mere translating of the titles and brief descriptive notes of the original, — which themselves sometimes show the need of an architect's supervision — as, for instance, where "*kreuzgewölbte*" is translated in one place "cross-arched," and in another, more properly, "groined," or where the ordonnance of a church interior is called the "interior system," or where, in several places, a building is ascribed to "the Transition Style," as if the term indicated a definite style in vogue at a definite period. The same lack of architectural oversight allows "corble-table" to pass uncorrected even in the numerous errata which are appended to each part, and may serve to excuse the extraordinary position given to the base of a pillar of the Church of St. Nizaire at Carcassonne. While speaking of the faults of commission, we may mention a want of consistency and method in the matter of proper names, which is common enough nowadays, but is none the less disagreeable, and always looks unscholarly. For instance, we find the "Forum Romanum," the "Theatre of Marcellus," and the "Teatro Comico" on successive pages; so, too, we have "St. Mark's Cathedral," and the "Library of San Marco;" we find even this mongrel title, "San Paolo before the Walls."

Some faults of omission are the more regrettable because the opportunities for avoiding them are evident, and the editor, without going much beyond the function which was assigned him, might have enhanced the value of his work very materially. One of the crying faults of the original is the lack of cross-reference between the cuts; for in order to accommodate cuts drawn from divers sources to the page of the atlas before us, portions of the same building are scattered here and there upon different pages wherever a space of appropriate size chanced to be left, so that much time is lost in determining whether or not a certain feature is represented. Even with the index which is to be supplied hereafter, cross-references would be of great use. There is, too, a want of geographical precision in stating the *locus standi* of a building; thus, on a page of German, Scandinavian, and English buildings we find examples of work at Jerichow, Ratzeburg, Raeskild, Dobrilugk, Stoneleigh, Loches, etc., which may all be German or all Scandinavian for anything that is said to the contrary. It would have been of great service, too, if the source from which a given illustration is drawn had been mentioned in each case, so that the student might know where to turn to satisfy the curiosity excited by this very interesting collection.

It was not to be expected that, inasmuch as the illustrations were borrowed from all sorts of sources, they should have any common scale, though there are cases, such as the parallel collection of cathedral plans on Plate 77, where this lack is seriously felt. In most cases the scale of each illustration is shown by an annexed graphic scale, but as this is expressed sometimes in *ellen*, sometimes in metres, and sometimes in feet, English, French, and German, it rather befogs than enlightens the understanding.

We have mentioned these defects and deficiencies, not to discredit the work or the conscientious labors of the editor, but because they are obvious shortcomings in what must be a really useful book, and some of them such as we may hope to see remedied or avoided in the parts which are still to be published, and in the volume of descriptive text which is to follow them.

The parts we have examined treat of (1) the architecture, sculpture, and industrial arts of antiquity, (2) early Christian, Romanesque, Gothic, and Mohammedan art, (3) Renaissance and modern art, and (4) Oriental and modern European art, while Part V., with sixty plates, will be devoted entirely to the history of painting.

As we have said, the collection is interesting and valuable, and as the price is not high we hope that students will try to possess it. Now that the undertaking is to a certain extent an accomplished fact, we should be glad to see Herr Seemann and the American publishers follow out the scheme, and issue from time to time supplementary parts which shall contain much of the old material that is now omitted, and such fresh illustrations as may be gleaned from the constant publication of new works in art.

PORTLAND CEMENT.[1] I.

I believe it is some forty years since Professor Donaldson made some very interesting and exhaustive experiments with Roman cement, and with the septaria from which that cement is made. Roman cement was then employed in almost every building of importance, while what is now known as Portland cement had scarcely emerged from the laboratory and was practically unknown. The introduction of this then new cement, it is needless to say, was met on all sides with great opposition, but its eminently hydraulic properties and great strength eventually asserted themselves, until at the present time Portland cement is synonymous with strength. But like all manufactures which assume large proportions there are unfortunately both good and inferior cements to be met with; and as the strength of a concrete or mortar must depend not only on the quality and properties, size and shape of its aggregates, and the means employed for their amalgamation, but also on the strength and quality of the cement, I propose in this paper to speak solely of the primary source of strength, namely, the cement.

The recognized tests for Portland cement are its weight per striked bushel, the fineness to which it is ground, its color and its tensile strength. With the exception of the tensile strength, which is an absolute test, these tests are really only problematical, for it is evidently possible to obtain a material that in weight, color and fineness may approximate to the standard required in Portland cement, and yet not be cement. Hence a bad or a damaged cement may possess all these requisite qualities, and yet fail in the crucial test of strength. It is also possible, but in a minor degree, to have a cement that is of the required strength, but would yet fail to give the results expected of it when made into concrete or mortar.

From experiments extending over a considerable period, the results of which are given in the accompanying tables, I hope to be able by (1) determining the work which a cement has to do, and (2) by considering separately the properties which it should possess to attain that object, to arrive at such results as will be of value to both users and manufacturers.

Concrete or mortar being a combination of aggregates which are united into a compact mass by means of the cement, it follows: that the cement should possess strength; that it should be so finely ground as to thoroughly intermingle with and separate all the aggregates used, thus cementitiously uniting each particle; that it should set fairly-quickly, and that it should neither expand nor contract during setting.

Without describing the manufacture of cement, which is carried out in various ways according to the nature of the raw materials used, it may be considered, for the purposes of this paper, a combination of carbonate of lime, silica and alumina in certain proportions. These ingredients are obtained in different localities in various forms. Thus, on the Thames, the white chalk, which is nearly a pure carbonate of lime, is used in combination with Medway mud, which contains the silica and alumina. In many works on the Medway the gray chalk is substituted for the white, and Gault clay is used instead of the Medway mud. At Folkestone and other places on the south coast, similar materials are used. At Harwich, Newcastle-on-Tyne and Stockton-on-Tees, a local blue clay which contains the requisite proportions of silica and alumina is used in combination with chalk, which is imported generally from the Thames. In the North of France — in the neighborhood of Neufchatel and Devres — a natural cement-earth is found, generally at the foot of the chalk hills. This material, which much resembles gray chalk in appearance, contains in many instances the exact proportions of lime, silica and alumina for the production of a high-class cement. At Rugby, in Somersetshire and other parts of England, the blue lias formation supplies the requsite ingredients, the stone and shale being found in layers of from a few inches to as many feet in thickness, one above the other. At Madras a cement is made from lime produced from sea-shells, used in combination with a river mud; and I have lately been consulted respecting the manufacture of cement from somewhat similar materials, namely, coral lime and a river mud, found on the opposite side of India. At Rio de Janeiro also similar raw materials are used. In Derbyshire the immense limestone hills may be made available for conversion into cement, in combination with a tufa which is also found in the locality. In Buckinghamshire, on an estate on which I am at present engaged, there has been found a deposit of a natural cement-earth, which lies immediately under the surface and averages about ten feet in thickness, lying directly on the Oxford clay; with it is intermingled a considerable quantity of a nodular limestone.

It would be needless to enter more fully into the geology of Portland cement manufacture, but it may be taken that wherever carbonate of lime, silica and alumina are met with, in a fairly-easy convertible form, there Portland cement can be made. But with each variety of material, different means must be employed for attaining the desired end; and to describe the process of manufacture in each case would take up more time than is at our disposal. The process may, however, briefly be divided into three stages, thus: the thorough mechanical combination of the raw materials, their calcination, and the reduction of the clinker by grinding to the Portland cement of commerce.

From this very cursory glance at the materials from which Portland cement can be made, and the mode of manufacture, it will readily be seen that there are many causes which may materially affect the result of the cement produced: the quality of the raw materials themselves, their amalgamation in correct proportions, their perfect mechanical combination, the proper calcination of the combination, the perfect reduction of the clinker to a fine powder, and lastly the careful storage and cooling of the cement before it is used.

Of the causes of many of the results which may be met with, it is impossible to more than allude to, but, assuming that the raw materials have been well chosen, — an imperfect amalgamation of them will probably produce a blowing cement; the use of an undue quantity of lime will produce the same result, combined with slow-setting powers, while the use of too much clay will produce a quick-setting cement, that will contract. Having secured the perfect amalgamation of the

[1] A paper by Mr. Henry Faija, Associate M. Inst. C. E., read before the Royal Institute of British Architects, February 23, 1880.

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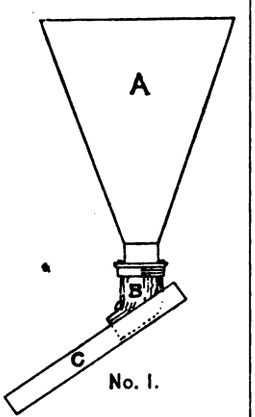
raw materials in the proper proportions, similar results may be obtained from imperfect calcination: thus a lightly-burned cement will be quick-setting, and an over-burned cement slow.

Having regard, therefore, to the number and combination of circumstances which present themselves for consideration, when it is required to divine the causes which produce certain results, I propose to treat solely with the peculiarities and properties which developed themselves during the experiments made with certain samples of cement, and to deduce from these results certain data which may be of service in judging of the quality of a cement for the purposes for which it is required.

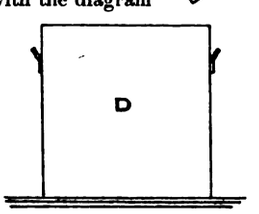
The quality usually required of cement is in accordance with the standard set by the Metropolitan Board of Works in the regulations relating to concrete buildings, thus: That "the Portland cement shall be of the very best quality, ground extremely fine, and weighing not less than 112 lbs. to the striked bushel, and capable of maintaining a breaking weight of 350 lbs. per square inch, after being made in a mould and immersed in water during the interval of seven days."

It must be admitted that, taken as a specification for cement, this regulation is rather vague; and as in all matters appertaining to the testing of cement great exactitude is required, and that a uniform and standard apparatus should if possible be adopted, I think that the Metropolitan Board of Works have it in their power, by somewhat enlarging on this regulation, to lead to the abolition of many abuses, and thus tend to the elucidation of many seemingly contradictory results.



No. 1.

As the weight per striked bushel of a cement must evidently vary according to the means employed to fill the measure, it is essential that it should always be filled in the same manner. The apparatus which I use, and which I think meets all requirements, is in accordance with the diagram No. 1. A is a circular funnel perfectly smooth into which the cement to placed; at the small end stocking B, which leads the zinc shoot C, placed 55°, the lower end of the inches above the top of The measure D, placed firm floor, on which there is never in any way touched during the process of filling, nor until after it has been carefully struck with a straight edge. When filling the measure the stocking may be held in the hand so as to regulate the run of the cement from the funnel.



In a paper I read before the Institution of Mechanical Engineers, in January, 1875, when referring to the weight of cement, I said: "A iron hopper or on the inside, be weighed is it has a canvas the cement into at an angle of shoot being five the measure. on a perfectly

TABLE No. I.

		Residue per cent after sifting through sieve having 2,500 meshes per sq. inch.	Weight per striked bushel.	Tensile strength on section 1 inch square.	
				7 days.	28 days.
			lbs.	lbs.	lbs.
No. 1.	Cement as delivered from manufactory,	25	114	535	661
	Do. ground to all pass sieve 2,500 meshes,	*Nil*	104	572	not taken
No. 2.	Cement as delivered	16	116	509	650
	Do. ground	*Nil*	109	542	675
No. 3.	Cement as delivered	14	116½	476	662
	Do. ground	*Nil*	112	505	710
No. 4.	Cement as delivered	33	118½	693	728
	Do. ground	*Nil*	105	666	810

light cement is generally a weak one, though it may be of the requisite fineness; at the same time, a heavy cement if coarsely ground is also weak, and will have no carrying capacity for sand. As the more the clinker is burned, the harder and heavier it becomes, and therefore more difficult to grind in the millstones, the heavy cements to be met with are almost invariably coarse ones; and as an under-burned cement from its softness will be ground fine enough, but will be found deficient in weight, it will be seen that the weight, unless taken in conjunction with the fineness, is no test as to the quality of the cement."

This opinion I have found confirmed by subsequent experiments, the results of some of which are given in Table No. I. In each case the cement was weighed and tested as delivered, and also when ground so that all would pass through a No. 50 sieve. The tensile strengths given are in each case an average of ten briquettes.

By examining these results, we find, first, that by fine grinding the weight per striked bushel is reduced, and, secondly, that the tensile strength is increased, both at the expiration of seven days and twenty-eight days from the time of gauging.

That the weight per bushel should be less, is what would naturally be expected, as it is evident that the finer particles are less dense than the coarse, and also that they fall lighter into the measure. That the fineness to which a cement is ground should affect the tensile strength in so marked a degree, may be accounted for by the fact that the coarse particles in a cement have practically no cementitious property, being little better than so much sand.

To prove this the following experiments were made with the core or coarse particles in a cement:—

1. The residue that would not pass through a 625-mesh sieve was gauged with water, and at the expiration of seven days was found to be merely held together in a mass similar to so much sand having a slight admixture of loam.

2. That which passed through the 625-mesh sieve, but would not pass through the 2,500-mesh seive, was gauged in a similar manner, and at the expiration of the same time was found to be in a similar condition.

3. That which passed through the 2,500-mesh sieve, but would not pass through a 4,900-mesh sieve, being gauged in the same manner, was, at the expiration of the same time, found to be in a similar condition.

These experiments were made with a cement that was perfectly set in thirty minutes after gauging. In each of these cases the pats could be crumbled to pieces between the finger and thumb, and the granulations were the same in size and shape as before the water was put to them, thereby proving that the granulations themselves had no power of setting, but were simply held together by the infinitesimal particles of finely-ground cement from which it was impossible to separate them. It therefore seems that the granular portion, or the core of a cement, has really a deleterious effect on its strength, and for all practical purposes may be considered only as so much sand.

TABLE No. II.

	Sample No. 1.		Sample No. 2.		Sample No. 3.	
	7 days.	28 days.	7 days.	28 days.	7 days.	28 days.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Cement as delivered from works,	535	661	509	650	481	650
Ditto all ground to pass No. 50 sieve,	572	—	542	675	505	710
Siftings only passed through No. 50 sieve,	547	697	573	668	452	629

Table No. II. gives the results of further experiments made with the same object. It will be seen that in samples Nos. 1 and 2 the cement was actually improved by extracting the core that would not pass the No. 50 sieve; but sample No. 3, which was a very finely-ground cement, slightly deteriorated; and it will be further noticed that all three samples were improved by fine grinding. Though in this paper I am not going into the strength of mortars, it would be well to say that the fine grinding would give a more decided advantage in the case of mortars than in neat cement.

Many people, even some manufacturers, consider the core to be the backbone of the cement, and to a certain extent they are in the right, but the result of these experiments proves that to be of value it must be ground. It is naturally the hardest-burned particles which form the core, those which the mill-stones have been unable to grind, through their being of a harder nature than the rest of clinker. The core, therefore, as core, is really only so much sand in the cement, but when ground acts in most instances beneficially, and improves the quality of the cement.

Table No. III. gives the results of experiments made with eight samples of cement, showing the specific gravity, weight per bushel, fineness, tensile strength at 7 and 28 days, and the increase per cent between those dates. If we examine the specific gravity and weight per bushel in conjunction with the fineness to which the cement is ground, it will be seen that a heavy weight per bushel and a heavy specific gravity denote a well-ground cement — while a heavy weight per bushel and a light specific gravity denote a badly-ground cement.

It has been proposed to substitute the specific gravity for the weight per bushel when testing cement; but it must be remembered that the object of testing cement is not only to determine the actual strength of the cement at a given date, but to be able to form a fairly accurate opinion as to its probable behavior in practice. I therefore think that to do away with the weight-per-bushel test would be, to say the least, undesirable, as when taken in conjunction with the fineness a very fair opinion can be formed of the value of a cement, — an opinion which can be confirmed by afterwards taking the specific gravity; in fact, the specific gravity, weight per bushel and fineness

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bear a certain relative proportion to each other, indicating either a light or heavily burned cement. By again referring to Table III. we find that the cements having a light specific gravity are quick-setting cements, which in seven days have already attained great strength, but which show but little improvement afterwards, while

TABLE No. III.

No.	Specific gravity.	Weight per striked bushel.	Residue per cent.		Tensile strength per square inch.		Increase per cent.
			No. 25 sieve.	No. 50 sieve.	7 days.	28 days.	
		lbs.			lbs.	lbs.	
1	3·09	116	2	16	509	650	27·7
2	3·00	116¼	½	13	400	550	37·5
3	3·00	116¼	0	14	471	594	26·1
4	2·99	118	4	28	605	772	27·6
5	2·96	116	4	26	586	767	30·9
6	2·95	113¾	3	33	473	558	17·9
7	2·90	111	7	30	701	718	2·4
8	2·90	118¼	8	33	693	728	5·0

those having a heavy specific gravity are slower in setting, and at seven days do not show such good results, but continue to improve for a longer period.

It is unfortunately impossible to lay down an absolute rule by which to determine the value of a cement. Almost every property, whether to its advantage or disadvantage, which it possesses, may be traced to more than one cause, and therefore might lead to opposite results in practice; and when it is remembered that an opinion to be of any practical utility must be given in a few days, and before the cement is required for use, it becomes entirely a matter of experience and thorough knowledge of the process of manufacture, to be able to give a reliable opinion as to the suitability of a cement to the work for which it is intended, by reference only to the problematical tests.

THE ILLUSTRATIONS.

THE CONY FEMALE ACADEMY, AUGUSTA, ME. MR. G. J. F. BRYANT, ARCHITECT, BOSTON, MASS.

THE first story and basement are to be of brick with stone finish and mullions for the windows. The tower will be of brick as far as the corbelled cornice, the upper open feature being of wood. The rear projection has two stories, to accommodate the assembly hall in the second story, but the remainder will have but one story and a half.

DINING-ROOM INTERIOR. MR. BRUCE PRICE, ARCHITECT, NEW YORK, N. Y.

DESIGN FOR THE TOWN HALL AT STOUGHTON, MASS. MR. T. M. CLARK, ARCHITECT, BOSTON, MASS.

HOUSE OF CASIMIR WERK, ESQ., WESTWOOD, O. MR. E. ANDERSON, ARCHITECT, CINCINNATI, O.

This building is to a great extent made fire-proof by the use of iron beams, and ceilings of artificial stone built in position in monolithic form, an example which might be followed to advantage by those building homesteads, as the additional cost in this building over the ordinary methods of wood construction was only about $3,000. The interior finish throughout is of hard wood.

AMERICAN INSTITUTE OF ARCHITECTS.

AT a late meeting of the New York Chapter of the American Institute of Architects, the following resolution, moved by Mr. Bloor, was adopted: —

"This Chapter learns with sincere regret of the recent decease of of Mr. Joseph Sands, a member of the Society, in its highest grade, since its organization, and for some ten years previously, and until his fatal illness, a Fellow of the American Institute of Architects.

"Although Mr. Sands's professional engagements, and especially his prominent and active relations to a noted ecclesiastical organization, — the foundation and promotion of which, it is understood, were largely due to him, — have deprived the Chapter of his frequent participation in its current business, his invariable promptness in meeting his other obligations to the Society, and the steady example he has set of faithfulness to his profession and of a high standard in the practice of it, have not been lost to discriminating observers, whether inside or outside of its ranks.

"Mr. Sands's devotion to higher interests than the reputation and profits of a secular pursuit, his prolonged ill health, and his early taking off, have each, doubtless, contributed to prevent the consummation that might fairly have been predicated of his professional qualifications, but more than enough has been produced to indicate the loss sustained by American architecture in his death."

FOX AND COCKS.

A FABLE FOR ARCHITECTS.

BY THE AUTHOR OF "THE AMBASSADOR EXTRAORDINARY."

Dedicated disrespectfully to the Competition Committee of the Royal Institute of British Architects and printed in the *Builder*.

SAID Madame the wife of Monsieur the Fox, one day, "*Mon cher*, it is necessary that one should be in the fashion."

"*Bon*," replied Monsieur the Fox, "*trés bon*."

"One must wear over one's shoulder ——" said Madame.

"Over the *left* shoulder, probably," interposed Monsieur, displaying all his beautiful teeth.

"Over one's *shoulder*," said Madame, with severity, "a bunch of the feathers of the cock. Hasten thou, therefore, *mon ami*, to the yard of the poultry, and purchase for me one."

"Thou shalt have," replied Monsieur the Fox, "a hundred."

"Thou art pleased to be merry," said Madame, "but one will suffice; and let it be, *mon cher*, a modest one, befitting our modest fortune."

"Do not fear," said Monsieur, "*ma petite*, thou shalt have the best."

"Alas!" sighed Madame, "one cannot always afford the best."

"They shall cost thee ——" said Monsieur the Fox, again displaying all his beautiful teeth, "the whole hundred of these bunches of the feathers of the cock shall cost thee — *exactly nothing*."

Remembering the sagacity of Monsieur, Madame smiled.

Through a gap in the fence of the yard of the poultry they surveyed the scene within, these two.

"*O ciel!*" exclaimed Madame, "what nobles!" For in the sun Messieurs the Cocks were strutting about so gallantly in their fine feathers of green and gold, that the eyes of Madame began to glisten. "*Mon Dieu!*" she said again, "who would not be a cock!"

Monsieur the Fox applied his mouth to a convenient orifice in the fence, and cried in a great sonorous voice. "*Cock-a-doodle-doo!*" said Monsieur the Fox. The effect upon the poultry was electrical. Fired by the challenge, which each one accepted as addressed to himself, not a cock in the company but at once answered it with the utmost courage and vehemence, till the whole world echoed with their crow.

"Messieurs the Cocks," said Monsieur the Fox, displaying all his beautiful teeth as he disclosed himself to their view with a profusion of polite obeisances, "behold in me a patron! Behold in Madame one who is ravished with the sight of your beautiful tails."

"*Vive Madame!*" cried the whole assembly.

"For Madame," said Monsieur, "it is necessary to be in the fashion. Madame would wear over her shoulder, — over the *left* shoulder, in all probability — a bunch of those exquisite feathers. For the satisfaction of Madame, therefore (and no less for the pleasure and advantage of Messieurs), I desire to do myself the honour to institute a little very amiable competition. Who shall produce the bunch of beautiful tail-feathers which shall best deserve the honor of Madame's preference? To that happy one I will do myself the pleasure of presenting a little very amiable premium. It shall be — one barleycorn!"

"Monsieur," replied the assembled Fowls, "thou art too gracious. Madame is much too graciðus. Do us the honor not to mention the barleycorn. We live by Glory, not by Barley!" Monsieur the Fox showed all his beautiful teeth.

"But," said the spokesman of this enchanted crowd, "in order to complete our happiness, grant us one little very amiable boon."

"It is granted," said Monsieur the Fox, "freely."

"In order that we may enjoy the satisfaction of experiencing perfect impartiality, — that is to say, that every cock of us may be cock-sure of conquering all other cocks, — behold Monsieur the superannuated rooster on yonder perch! Let him be Monsieur the Professional Adjudicator, and instead of a dozen of paltry chickens, with never a tail amongst them to swear by, Madame shall have a hundred princely chanticleers competitors for her favor, and every one of them with feathers fit to flaunt upon Olympus!"

"Descend thou, then," said Monsieur the Fox, affably "— Monsieur the Professional Adjudicator, descend; and do me the favor to enjoy the honor which I confer upon thee." And the Fowl descended from his perch with exceeding alacrity, and rejoiced in his honor after the way of all the world.

See now these inflated Poultry! Not a cock of them all but is capering about like a half-mad cock, and plucking forth with pain unspeakable his best tail-feathers; so that in a little time behold the whole array of them marshalled before Madame the wife of Monsieur the Fox, and Monsieur the Professional Adjudicator, each one carrying his bunch triumphant in his hand.

As for Madame, she knew no more which to prefer amongst so many bunches of beautiful feathers of the cock than would she have known which to choose of the six-and-twenty stenches of Cologne; but there was a handsome young chanticleer who had gained her ear on the sly, and she had resolved that none but his bunch of feathers should be selected, come of it what might!

Monsieur the Adjudicator, on the other hand, whose ear was deaf to all blandishments under the sun (for his senses, if the truth may be told, were getting a little mouldy), happening to discover a bunch which reminded him of his grandfather's tail, would think of nothing else but the preferring of this. And thus there arose a little very

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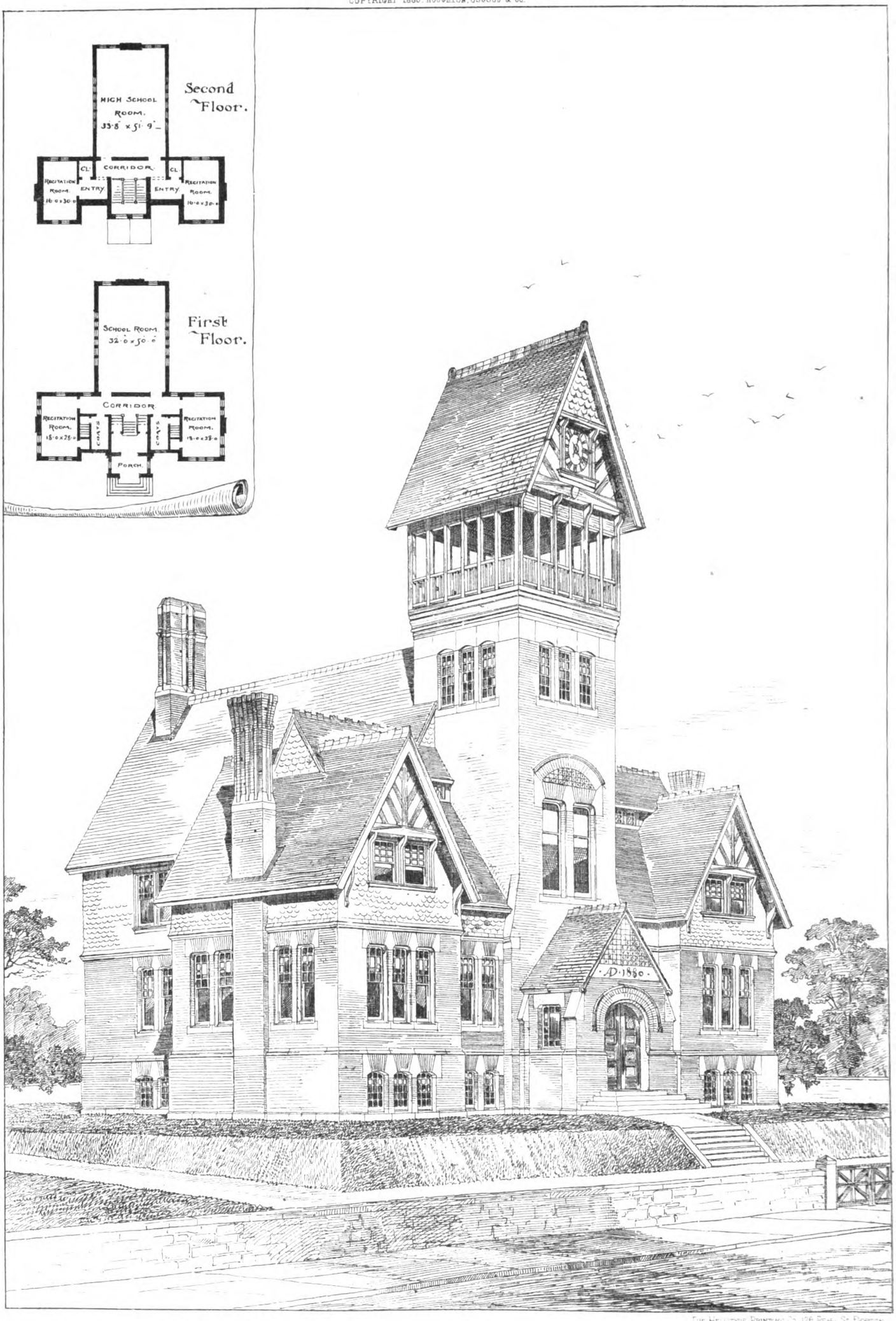

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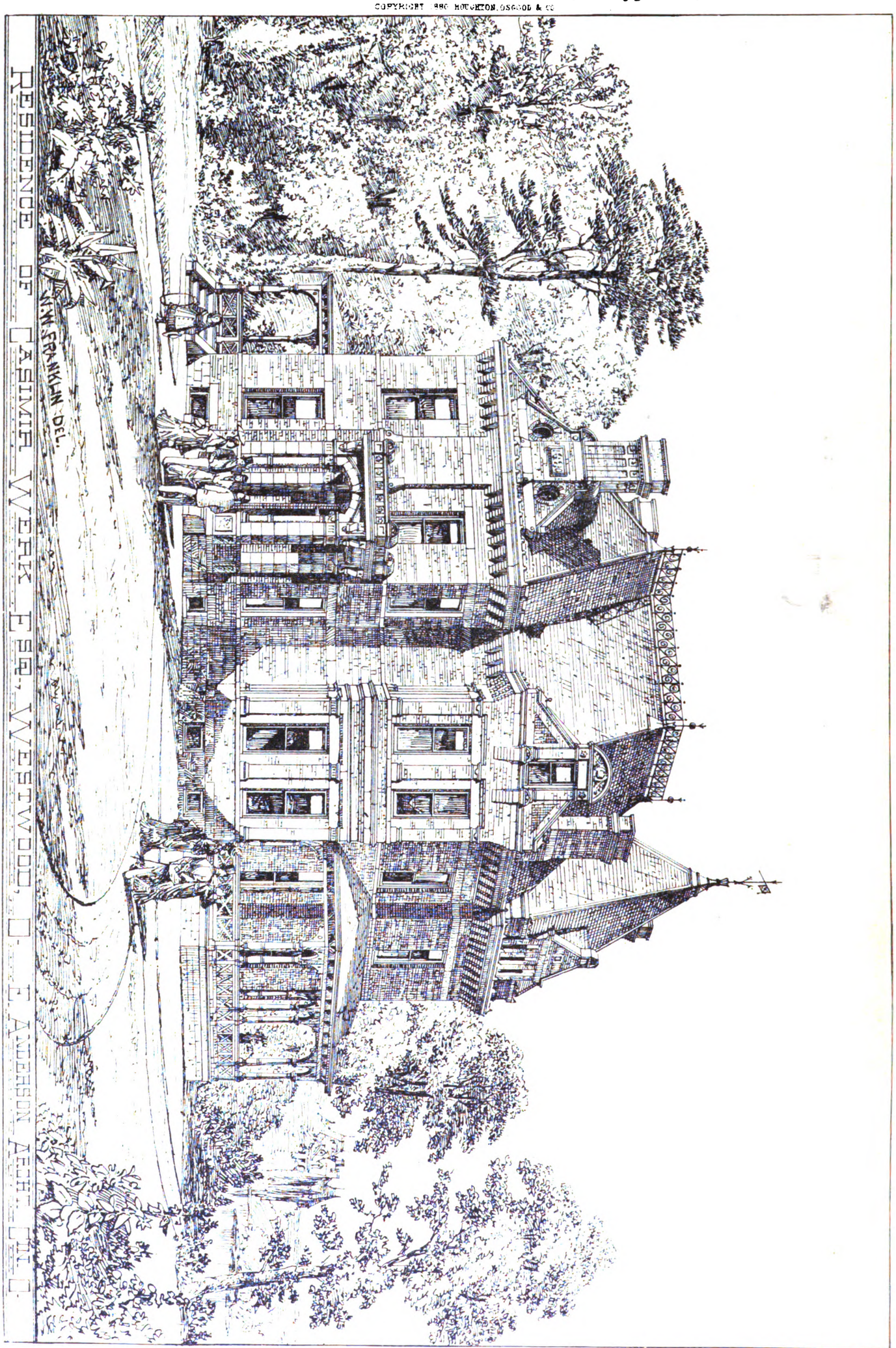

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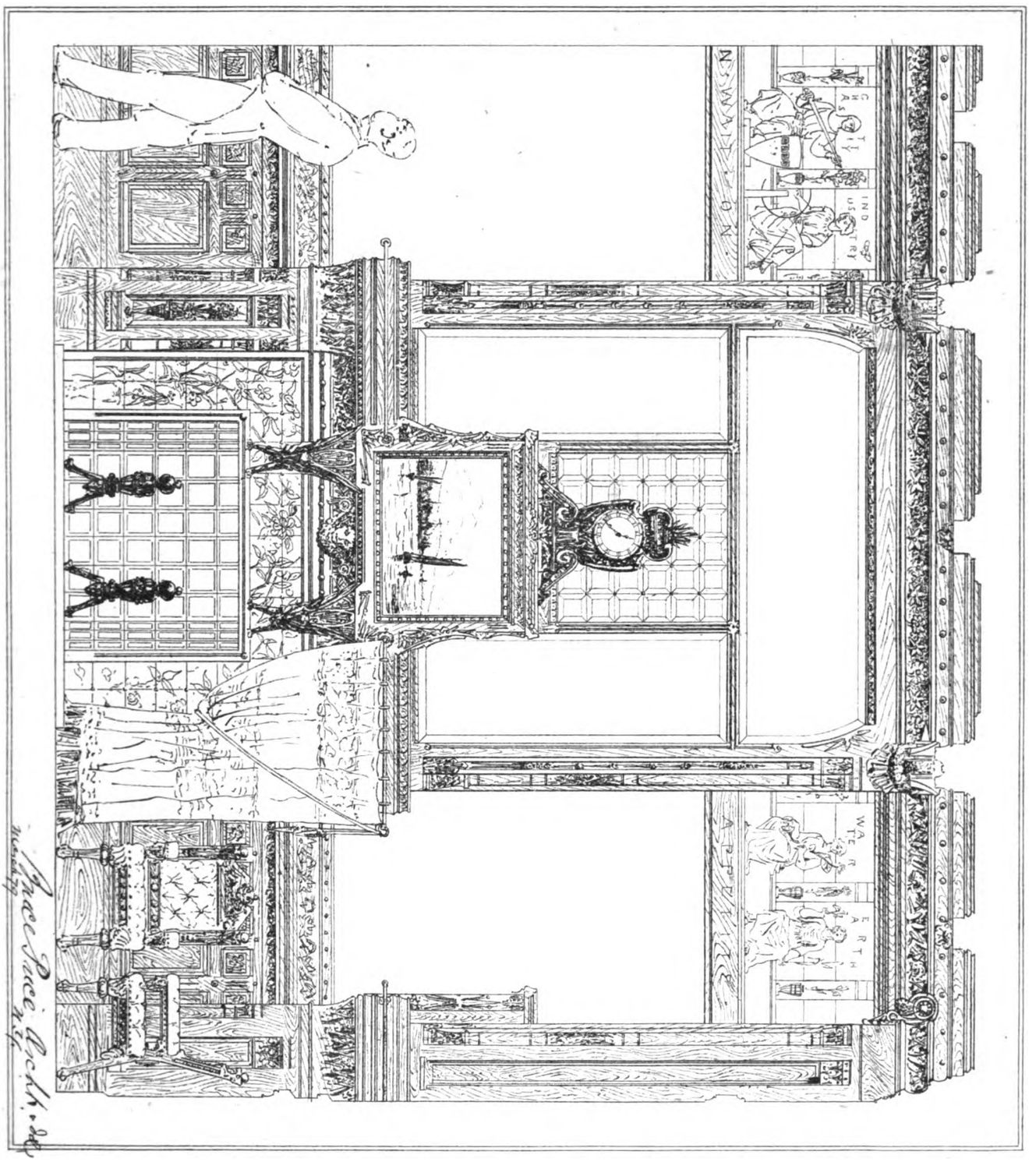

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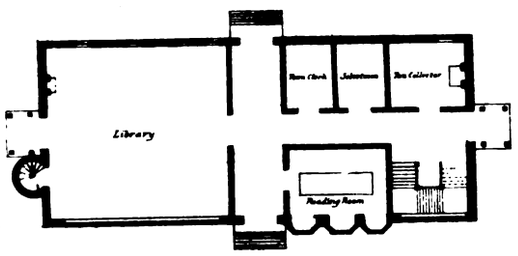
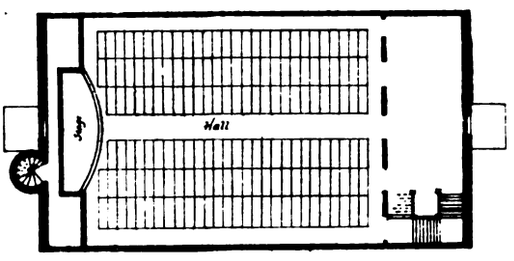


First Floor Plan



Second Floor Plan

THE HELIOTYPE PRINTING CO. 337 CONGRESS ST. BOSTON

DESIGN FOR THE TOWN-HALL AT STOUGHTON MASS.

T. M. CLARK ARCH'T.

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amiable difference of taste, which presently engendered such heat that it was well the whole world was not consumed in the blaze!

Inflamed with indignation that could not be controlled, and raising with one accord a crow of mutual defiance which the very clouds re-echoed with dismay, behold the whole company of the infatuated competitors now rushing upon each other with fury inexpressible! Needless it is to say that, in an instant of time, not a bunch of their feathers but was trampled ignominiously in the mire. But alas! this was the least of it. Exasperated with anger that increased every moment, and reckless of consequences to the end as they had been from the beginning, they tore each other's combs, plucked off each other's wattles, pecked out each other's eyes, and, ere one could call upon Heaven for help, had so mauled each other with spur and beak, that nothing remained of the struts and crows of the invincible but the spasms and gasps of the vanquished!

But the sorriest sight in the scene was Monsieur the Professional Adjudicator. Unfortunate Fowl! Assailed by all and defended by none, he was found in the midst of the field as flat as a pancake, without a hair on his head or a breath in his body.

During the progress of these events, Monsieur the Fox shook with laughter till his beautiful teeth rattled in his head. But at the close, as he wiped his eyes with his tail, he gave utterance to the following very amiable reflection: —

MORAL. — *For the favor of a Fox, and the prize of a Barleycorn, there will always be foolish ones to fight.*

THE POSSIBLE DANGERS OF STEAM-HEATING.

MR. W. J. BALDWIN, of Elmira, N. Y., writes as follows to the *Scientific American* in criticism of the views on the danger of the ignition of wood-work by steam-heating pipes, which were lately advanced by Mr. Edward Atkinson, of Boston: —

It would be well to define the difference between seasoned wood, charred wood, and charcoal.

The first admits of no degree: it is simply wood with the sap and the excess of moisture, above what would be incidental to the hygrometric state of the atmosphere, removed.

The second admits of degree, and is wood with the hydrocarbons partly driven off, according to the completeness of the charring.

The third admits of no degree, and is nearly pure carbon and ashes.

I inclosed a two-inch cube of white pine wood within a small gas-pipe retort, with a bit of solder (one-third tin and two-thirds lead) and a bit of sheet-lead, and placed the retort in a boiler-tube for five days, boiler going day and night. At the end of that time the wood was pure charcoal, the solder was melted, and the lead was not, which goes to show pure charcoal can be made at a temperature between 500° and 612° Fahrenheit. To prove the the above was pure charcoal, *i. e.*, that all the hydrocarbon was driven off, I raised the temperature of the retort to about 1,200°, but could not drive off any more gas.

In October, 1877, I inclosed pine laths against the shell of a horizontal boiler, and covered them with a course of bricks on edge. The pressure of steam in this boiler has been 40 to 60 pounds day and night since, except one day a month for cleaning. The ends of the laths that came out to the air and flush with the brickwork are not nearly as dark as hemlock-tanned leather, and the darkest part I could find which was entirely covered with brick is not as dark as roasted coffee. This goes to show charcoal cannot be made at 300° Fahrenheit, after two and a half years, under the most favorable circumstances, with a furnace fire only five feet beneath it. To prove that this wood was not charcoal, I placed it in a retort, and drove off gas that burned with nearly as much light as illuminating gas when it leaves the retort.

In experiments on the ignition of charcoal, I found that the charcoal made in the boiler-tube would not redden at the melting point of lead (612° Fahrenheit), but would at a lower temperature than zinc (770° Fahrenheit.) My mode of operation was this: I passed a gas-pipe through a fire, and blew pure air through the pipe. I also prepared myself with long slender strips of solder (half-and-half, and one-third tin and two-thirds lead), and with strips of lead and zinc, and pine shavings, and small pieces of the laths and charcoal. The pure charcoal would not redden in the same blast that just melted the lead, but did in a blast which melted it rapidly. When held in a blast which melted solder (one-third tin and two-thirds lead, melting temperature about 500° Fahrenheit), it showed no signs of fire or redness.

The lath, which was two and a half years in contact with the boiler under a course of brick, would become charcoal in a temperature which melted half-and-half solder, but would not get a spark on it until I increased the temperature to where the needle of lead bent and dropped. So too with a nicely prepared splinter of white pine, in which I could see no deviation in the action from the splinter of the lath; they all became charred in the blast which melted half-and-half solder, but would not take on a spark until the lead melted.

With a blast that fused a metal 19 parts tin, 31 lead, and 50 bismuth, melting temperature about 212° Fahrenheit, I could not turn tissue paper brown.

Gunpowder held in the blast which melted the lead did not explode until after the lead melted. It gave off a slight blue sulphurous light first, then the lead melted, and an instant after the powder exploded.

The statement I made in my first letter I now repeat, "that the temperature at which wood and charcoal fire is between 500° and 700° Fahrenheit," and that the purer the charcoal, the higher the temperature required.

Illuminating gas will not take fire from a cherry-red poker, but will from a bright red one. The gas of wood, crude petroleum, soft coal, or any other hydrocarbon, will not take fire when escaping hot from the retort. With a cherry-red poker I have tried the three mentioned.

I now wish to say that it was not my intention to make any of the readers of your journal careless in construction, and I would be sorry should my remarks be the cause of loss to any of them.

I will comment on the points in Mr. Atkinson's letter as they occur, and will then try to show where the real danger lies in the use of boilers and steam-pipes.

Is it not more likely that the wood of the "open boiling keir"[1] was darkened in color by the oxide of iron from the nails than charred by the temperature of boiling water at atmospheric pressure, conducted through the length of the nails into the wood? and is not this *rusty* appearance often taken for charring?

The "fine charcoal" under some conditions might be classed with damp cotton, slack of soft coal, or lampblack; but while workmen are allowed to carry matches in their vest-pockets, it would be safer to associate it with the matches, especially in the face of all the steam-pipes that are packed in charcoal, and one in particular in California, through which where high-pressure steam is carried 2,600 feet into a mine packed in charcoal.

The steam-pipe "through the sill" prepared it for fire by drying it, and the dropping of a match, the fire from a cigar, or the superheating of the steam by getting low water in the boiler, could start it into active combustion. The same remarks will apply to the floor beam.

"Oiled waste cotton or wool, and greasy overalls," have taken fire from being locked in a tool-chest, *without* the aid of a steam-pipe.

I will now endeavor to show why any one, whether insured or not, should comply with the requirements of the underwriters with regard to steam-pipes and boilers, especially the latter.

When a journeyman, working in New York city, I was sent to John Hecker's house, in great haste, to see what the matter was with the steam-heating apparatus. As soon as I entered the hall door I "smelled a burned boiler," and when I reached the boiler-room I saw one. The generator was a sectional pipe boiler, and was red-hot, with the pipes badly warped, and the fire still in the furnace. Upon investigation I found that the hair-felt and canvas covering was charred through, the latter being as brown and crisp as burned leather for a distance of about fifteen feet, and beyond that, for about fifteen more, it showed signs of charring, lessening with the distance. It surprised me the house did not take fire, for, instead of having steam at a *maximum density* in the pipes, it was at first *superheated* (cause, very little water in the boiler), and as the pressure found vent through the burned boiler (as some of the tubes were burned through), it must have been red-hot air or gas which filled the pipes, and nothing but the want of circulation prevented it from carrying the heat to the small uncovered pipes throughout the house.

This is not the only case that came under my notice. The First National Bank of Pittsburgh had nearly the same experience when the janitor, in the fall of the year, fired two horizontal multitubular boilers for three hours (8 A. M. to 11 A. M.) before he discovered anything wrong. He then came to look for me, and did not find me until 1 P. M. The boilers were still hot, and the uncovered pipes near the boilers were turned blue-black, the same as if they had just left the welding furnace and cooled; but where they were covered, the composition did not fall off, it being one of the lime and asbestos mixtures. Another case was a private house in Detroit, where the blow-off cock was opened maliciously, and the Chalmer-Spence covering was charred and destroyed, and had to be replaced on the boiler, and for about six feet beyond it on the main steam-pipe.

I cite the above to show there is danger from superheated steam-pipes, and though the superheating of pipes is not an every-day occurrence, it is safe to say they are more frequent than boiler-explosions.

FRENCH MEDIÆVAL ART IN ITALY.

[The following extracts are from private letters from an English architect now travelling in Italy, and touch upon matters that will attract our readers.]

FLORENCE.

"I AM just going down to Rome for a few days, and then on to Palermo, to have a careful look at the Norman and Byzantine work which was being done there when Niccola Pisano went to the Sicilian Province with Frederic II., before he did his pulpit. I feel sure of this: that he brought back with him to Pisa a French sculptor, one who was a far better sculptor than he was himself. For the

[1] This was a wooden keir in a bleachery, which, becoming rough on the inside through constant use, was coated with a layer of concrete held in place by keying onto the protruding heads of nails that had been driven into the sides of the keir for this purpose. After the keir had been in use for some time it was discarded in favor of another apparatus, and broken up. It was then found that the wood-work of the keir was apparently charred through, and it was assumed that the nails had so conducted the heat of the boiling contents of the vat as to char the wood-work.

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lion which this Norman carved for the Niccola pulpit is incomparably finer sculpture than the other two evidently executed by Niccola. The capitals and vases are pure French, the cusped arch an adaptation by Niccola of French Gothic as used (I believe) at Palermo.

"Niccola evidently was very eclectic, easily impressed by new influences, always ready to adopt new forms which he came across. He soon cast off what he borrowed from the Normans, keeping only the cusp, — never even caring for the pointed arch, while he retained for a long while a strong feeling for Roman forms, which really form the basis of his own individual work. The strongest work of his, and that showing his own individuality when most free from extraneous influence, is the Deposition over the west door at Lucca (the Duomo), now being cast for Mr. Ruskin. This, though now much mutilated, is a most wonderful piece of work, and shows much more (I think), what a strong man he was than the pulpit at Pisa. I have been carefully tracing the progress of sculpture from his first work at Pisa to the last work of the Pisani on the Baptistery doors here. It is most interesting."

Palermo.

"I have come down to Palermo for a day or two, to trace, if possible, what there was of French Gothic here when Niccola Pisano came south in 1221–32. I cannot find a trace of any cusped arch prior to 1328, though the pointed arch is used here as early as 1132. Nor can I find any mouldings, or sculptured capitals in any way resembling those introduced in the pulpit at Pisa. The man who worked with Niccola on this pulpit was not brought from the South, but must have come from the North to Pisa, probably sent for by Niccola on his return to Pisa because he so admired the Norman work at Naples, and in Palermo, the Norman capital. The Gothic never took seed here, but was merely grafted on the Saracenic and Greek architecture, very soon running into all manner of extravagances, and then disappearing altogether. Florence seems to be the only place in Italy in which the pointed style is naturalized and shows sign of its vitality by its growth. Everywhere else it remained just as it was introduced, or else died out.

"Since I have been in Florence, I have found out by help of the Keeper of the Archives a good deal about the building of the Campanile and Duomo, of which I can tell you this now. Giotto made a design for the whole Campanile, and built the foundations and first story, *i. e.*, up to the cornice level with the head of the central statuette over the door. Andrea Pisano built the next story, and was then turned off because he did not please the Florentines. Jacopo Talenti built the remaining three stories, Arnoldo working the marble for him. You will hear more of this Arnoldo, when we come to speak of the Duomo. In the details each man's work is distinctly traceable. This Talenti was a great master architect: he designed most of the external work of the Duomo."

WATERFORD CATHEDRAL SPIRE.

Probably many of our professional readers have experienced difficulty, in works of reconstruction, in arriving at a complete agreement with the contractor as to the actual amount of demolition and rebuilding necessary. The builder may consider that an uncondemned section of the fabric is so far dangerous that he declines to take the responsibility of building upon it; while the architect, although convinced that he is acting within the bounds of prudence, not unnaturally objects to this shifting of the onus on to his shoulders, lest he should be made answerable for negligence or bad workmanship occurring without the knowledge of either the contractor or himself, which might affix an unjust stigma on his professional character. One of these awkward differences of opinion between arehitect and builder recently occurred in the rebuilding of the spire of Waterford (Protestant) Cathedral, and has resulted in the satisfactory vindication of the architect's opinion. At the last meeting of the Diocesan Council of Waterford, a letter was read from their architect, Mr. J. Franklin Fuller, F. S. A., of Brunswick Chambers, Dublin, announcing the successful completion of the cathedral spire. The old spire was faced with flags, laid against a brick cone; and some of these were broken by the corrosion of the iron cramps, others had slid and fallen. A contract was entered into with a local builder, to repair and point the old spire; but after fixing the scaffolding, he reported that the stone-work could not be repaired. In this Mr. Fuller, on re-inspection, agreed; and the spire was taken down, and a contract for a new one of well-bedded masonry signed. The builder now reported that the tower itself was unsafe, and refused to build, except at the architect's risk. Mr. Fuller not unnaturally declined to accept such a responsibility, and, to end a dead-lock, suggested that the builder should be compensated for material and loss of contract, offering his own fees to meet the expense. This was adopted, and the architect then offered to take all risk and get a new spire built, if he might enter into a fresh contract with one of two builders whom he named, and appoint his own clerk-of-works. He was allowed to have his own way as to both builder and foreman, the latter being Isaac Abraham. The spire was successfully rebuilt on the tower reputed to be dangerous, and, although surrounded at the time by scaffolding, withstood the test of the gale which caused the Tay-bridge disaster. After hearing the letter in which these facts were recorded, the Chapter of Waterford passed, at the instance of the Dean, a motion in which they congratulated Mr. Fuller on the successful termination of the undertaking, and thanked him for having generously remitted his fees as architect. — *The Building News.*

ANOTHER WESTERN COMPETITION.

Des Moines, Iowa.

To the Editor of the American Architect:

Dear Sir, — As you have on various occasions published notices of "Western competitions" perhaps the following narration of one, that the architects of this city have just experienced, may be of interest to your readers, especially to that portion among the younger members of the profession whose course, like the star of empire, is Westward.

Not less than two years ago, the society known as the Fifth Street Methodists — one of the wealthiest congregations in the city — began to agitate the question of building. No little time was spent, and no small sum of money lost, by purchasing and again changing various lots on which to build the proposed structure; but this part of the programme was definitely settled some two months ago, by the choice of a piece of ground adjoining the parsonage, queer and irregular in shape. A financial committee was next appointed, of whose doings I need not write, except to note the significant remark of one of the thousand-dollar contributors, whose gift was subscribed on condition "that the plans adopted should be satisfactory to himself;" another equally liberal gentleman, after learning this, made his subscription on the same terms. Their labors done, the committee on plans was next appointed, consisting of a bishop, a pastor, three lawyers, one editor, a builder, and a merchant, an array of talent that was supposed to be abundantly sufficient to secure just the plan wanted. But among the above-named persons, were the two conditional subscribers, the object of which was perhaps not so well understood by any, as by certain expectant competitors. At this point the architects of this city, five in number, were notified, if they had designs to submit for their consideration, or preferred to prepare competitive sketches, they could do so, but must send them in by noon Tuesday, Feb. 22; said designs must be based on a maximum cost of $35,000, and must be without cost to the committee, *save* good will.

As the proposed structure was to be the largest and costliest in the city, several of the architects entered on the work of preparing their plans, with an unusual amount of energy and zeal, this being a chance to display their abilities in the ecclesiastical line, such as had never before presented itself: so on the day appointed, all the designs were sent in, some finished in brilliant colors, others in rough pencil, evidently prepared in haste, and others, too, prepared far in advance, bore the evidence of considerable handling, being the work of those said to be on the inside track. At the first meeting of the committee architects were excluded, they desiring to examine the plans privately; a subsequent meeting was next announced, at which the various competitors were notified to appear, and explain their individual designs in detail, discourse with them on acoustics, heating and Ventilation, and other questions that they might choose to propound, all of which accrued and resulted in the appointment of the final meeting at which one of the plans was to be adopted.

The time arrived, and the various plans were again discussed, but the longer they examined, the more convinced they were that none of the submitted designs completely met their ideas, although several of the members seemed decidedly in favor of adopting certain plans. The committee, finding it impossible to adopt a *plan*, now began to consider the advisability of selecting an *architect* who should draw the plans according to their specific instructions, having now determined on quite a different location for the building, and having learned all about church architecture, from a source already explained, and from certain books on church building in the hands of some of them, they being moreover all smart men, lawyers, doctors, etc. At this turn, the real contest began. The session being strictly private, the character and abilities of proposed candidates were now discussed by the different members; the builder especially, being thoroughly acquainted with all the architects, and their methods of doing business, ability, etc., was given special attention, speaking of each in rotation, and when he came to speak of a certain prominent but youthful practitioner, he declared him incompetent; at this unfortunate statement, one of the lawyers, sprang to his feet, declared that statement improper, and wrong, and demanded its retraction, but the stubborn builder declined, and said he was ready to prove the charge; upon this, the indignant lawyer became more indignant. Considerable confusion followed. However, a final vote was taken, resulting in the choice of the one whom the builder had recommended. The indignant lawyer though angry did not interfere with the appointment of a committee to wait on the chosen architect, prescribe conditions, and report his acceptance, all of which were complied with by that party, who was then advised to appear at the next meeting, and receive *instructions*. He did so, but upon his entering their presence, the indignant lawyer demanded his withdrawal, after which he proceeded to organize the committee as a *court, to try the unfortunate builder for libel.* Upon the day appointed, all members were present; the builder reiterated his charge, produced his evidence and witnesses. The libelled candidate, accompanied by the indignant lawyer, declared the statements false, and proceeded to prove his ability as an architect by numerous statements from prominent State officials, and some builders, and among other things stated as evidence of competence that he had spent seven millions. The trial occupied two sessions; meeting after meeting followed, but the friends of the chosen architect held their ground, no ballot being attempted by the opposition, who finally gained sufficient strength to rescind the former action, and through manœuverings peculiar to lawyers, — especially those of honorable standing,

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— wound up the disgraceful affair, by securing the adoption of the following proposition: "*The cheapest man out of three selected architects shall do the work.*" The architects were required to send in their written propositions, for making complete plans, specifications, details, and superintendence: the result of which was, that the work was given to one who throughout the contest had but one vote, but that *one* was from a "conditional subscriber," and the architect accepted the work for *one per cent*, thus defeating all competitors on the basis of *economy*, instead of real merit, which fact will doubtless check their zeal in all future competitions, if not prove disastrous to the establishment of an honorable profession in the West.

Henry F. Liebbe.

A QUESTION OF PRIVILEGE.

To the Editor of American Architect:

Dear Sir, — I should be glad of a reply in regard to the following matters of office routine, in the columns of the *American Architect*, if deemed of sufficient interest.

(1) Is it the *right*, or is it only the *custom*, for an assistant to place his name with "*del.*" affixed on finished drawings which he has made for his employer?

(2) If only a *custom*, is the *privilege* often denied?

(3) In the case of students who are paid a limited sum per year, is it customary to exact extra labor of them without additional compensation?

A reply to these queries will be considered a favor.

If the subject is deemed of sufficient importance, a few subscribers would like to see one or more articles in the *American Architect* on "The proper relation of employers to assistants and students."

If thought best to publish the queries proposed, please do so over the signature of Yours truly,

"A Subscriber."

[We should say that it is clearly a privilege, and not a right, of a salaried draughtsman, to sign his name to the drawings which he makes for his principal. It is a privilege often allowed to draughtsmen whose skill enables them to claim consideration from the architects who employ them. Every draughtsman may if he chooses demand it as one of the conditions of his service, as he may any other privilege; his success in securing it will depend on his value to his employer; but the drawing is, in the ordinary practice, the property of the employer, made for his service, under his direction, and the draughtsman has no right to put anything whatever upon it except by his authority or permission.

When an architect's drawings are signed by the draughtsman, it often means that he is not the fixed employee of the architect, but is established in an independent business, and employed "by the job." If such a draughtsman is in the habit of signing his work, we question whether the employer has any defence against this — we doubt, that is, whether he could refuse payment on account of the signing, which is his only means of constraint — except by stipulation in advance. The signing, however, is in any case an assumption of privilege, like the sewing of a tailor's label into a coat, not the exercise of a right; and the architect may, if he chooses, erase the signature, as he may any part of the drawing, the question being in reality one of comity rather than one of rights. Where hours are counted, as in the case of men who are paid by the day, there is no excuse for asking for extra service without extra pay, and most architects are careful not to ask it in any case, except where it is justified by a confidential relation between themselves and their draughtsmen. In the case of mere students, that is to say unskilled learners, we imagine few architects expect it. There is probably no usage sufficiently fixed to be cited as general.

As to question 3 — The pressure of an architect's work is apt to be more or less irregular, and architects often expect, we think, that their *salaried* assistants will be willing now and then to help them through a pinch with extra labor. Such labor is to be looked on distinctly as a favor, not a thing to be exacted, and favors on one side are reasons for favors on the other. An architect may of course abuse his opportunities in this way, and abuse of them is a grievance to which the draughtsman is not bound to submit. When such extra labor is prolonged or frequent, it justifies a demand for extra pay. When the demand becomes justifiable, is a question to be settled by special understanding, and one of the many that call for mutual concession and forbearance. Eds. American Architect.]

THE STOPPAGE OF FIRES IN WALLS AND FLOORS.

To the Editor of the American Architect:

Dear Sir, — Under the above heading in your issue of March 6, your correspondent "Subscriber" asks several questions, the answers to which will be found advertised on page vii, of the same number, whereas the most important point in fire-proofing seems to have escaped her notice, — the air-space between roof and top-floor or attic-ceiling.

This space, which is provided to afford level ceilings under a slanting roof, is absolutely inaccessible in case of fire. If ceiling and roof were compact or close together, the spreading fire from an adjacent building would have no hiding-place, as in this air-space, and, if burning through the roof, might be attacked from within; whereas, with the air-space the roofing-beams may be partially consumed by fire before the top-floor or attic ceiling gives way or shows what is going on above it. If the conflagration or fire starts from below, or within the house, this air-space is treacherous to the firemen who may be on the roof, because the pent-up fire will not give timely warning.

Allow me to offer a suggestion on another subject, which, dealing with façades or exteriors, may be perhaps of more interest to your professional subscribers: —

During active business season the down-town streets of New York frequently present the spectacle of a "jam" or dead lock — which under my own observation lasted once in last December for nearly two hours. That is to say, a dray or cart standing corner of West and Courtlandt Streets would have to wait that long before it could be hauled some ten blocks further, say to the Erie Chambers' Street depot. As our down-town streets intersect at right angles, — the lateral streets leading straight onto about a dozen ferries — the city of New York should rebuild the two corner houses opposite each ferry, making them round-cornered, and increasing the width of roadway accordngly. This is all the relief necessary.

Respectfully, E.

THE STOPPAGE OF FIRES IN WALLS AND FLOORS.

Montreal, March 31, 1880.

To the Editor of the American Architect:

Dear Sir, — The following information may be of some use to your correspondent on the above subject, which appeared on page 98, No. 219.

All wood-work in houses, such as beams, joists, rafters, laths, the under side of flooring, etc., if well saturated with two or three coats of silicate of soda, diluted sufficiently to make a wash, is rendered almost uninflammable; at any rate, sufficiently so to give ample time to subdue incipient fire. The sheds in the dock-yards in Great Britain are washed over with this solution. If a coating of chloride of calcium is passed over the silicate of soda, before it is dry, the combination forms a silicate of lime. Silicate of soda and chloride of calcium are the principal ingredients used in the manufacture of Ransom's artificial stone.

If between partitions, and all hollow spaces, four rows of brick-work were laid in cement, and bricks carried from under the flooring to the ceiling joists, so as to cut off draughts, and check the course of a fire, it would not only be a fire-guard, but effectually exclude vermin.

For the information of your lady correspondent, it may be as well to mention that silicate of soda (water-glass) is simply dissolved flint, and when coated over wood, enters into its pores, and formes a film of glass on the surface. It, and chloride of calcium are quite cheap substances, and can be obtained at any wholesale drug house in Boston or New York. Yours truly,

F. N. Boxer,
Editor Scientific Canadian.

PUBLICATIONS RECEIVED.

Sewage Disposal. By Henry Robinson, M. Inst. C. E., F. G. S., F. R. G. S., Author of "Purification of Water-carried Sewage." London and New York: E. & F. N. Spon. Price $1.50.

NOTES AND CLIPPINGS.

Growth of Cremation. — Crematories, it is stated, are to be built during the spring in the vicinity of Chicago and New Orleans, and there is a plausible rumor that a stock company is now forming to build two in the neighborhood of New York. In each of these cases the undertaking is the work of speculators who propose to take advantage of the increasing number of people who, whether from sentimental or sanitary reasons, would prefer burning to burial. There is no reason why a cremation company should not make a fair profit as well as cemetary joint-stock companies or undertakers; and here is little doubt that, as soon as the disagreeable notoriety now attending the rite is removed, it will be preferred by many persons, especially of the more educated classes. Experimenters in crematory buildings should profit by the failures and successes of their pioneer, Dr. Le Moyne. In the first place, there is no reason why the rite or the place of its observance should be made so coarse and repugnant in outward detail as they are at Washington, Pa., where the furnace resembles the corner of an iron mill, and all religious observances are forbidden. The stern old reformer thought to commend his innovation by its simplicity, cheapness, and disregard of all symbolic or devotional ceremony. The cost of Dr. Le Moyne's crematory did not exceed $2,500. Improvements in the construction of the furnace have been made in Italy since that at Washington was built, which the new experimentors will do well to examine closely before building. In some furnaces in Europe gas is used as the heating power; in others the body is subjected to the action of steam before it is sealed up in the retort, by which means it is claimed the bones are reduced wholly to ashes. The operation, too, need not be made an expensive one to those who choose to use it for their dead, to yield the owners of the furnace a fair profit. In Dr. Le Moyne's crematory the whole cost of each incineration was covered by $10; a charge of $25 would pay the company a fair percentage on their money invested. — *New York Tribune.*

The Capacity of Some Churches. — *Le Technologiste* states that the largest European churches will contain, in round numbers, — whether seated or standing is not clearly indicated, — the following numbers of persons: —

St. Peter's, Rome	54,000
Milan Cathedral	37,000
St. Paul's, Without, Rome	25,000
St. Sophia, Constantinople	23,000
Notre Dame de Paris	21,000
Cathedral of Pisa	13,000
St. Mark's, Venice	7,000

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The Efficiency of the Water-Seal Trap. — A paper by Dr. Neil Carmichael, M.D., describing an investigation into the trap and water-closet system, was read lately before the Philosophical Society of Glasgow, and has since been published. He supports the theory that the particles ordinarily found in sewer air are not emanations from infectious diseases, and are not capable of originating them. What is more, he maintains that germs do not pass through a sound water-trap, and, therefore, that water-traps are, for the purpose for which they are employed, that is, for the exclusion from houses of injurious substances, perfectly trustworthy. They exclude, he says, the soil-pipe atmosphere to such an extent, that what escapes through the water is so little in amount and so purified by filtration as to be perfectly harmless. Dr. Carmichael attributes the influences which sometimes arise where there are sinks and water-closets to the soil-pipes. One of his experiments demonstrated that a pin-point hole in a soil-pipe allows the passage of germs and other particles in considerable quantity, and a hole of that size is a source of danger. The whole paper deserves attention just now, when so many sanitarians believe in the inefficacy of sealed traps. Dr. Carmichael's experiments appear to have been conducted in the most painstaking manner, and while he is urgent in his recommendations, he is not to be reckoned among the alarmists. — *The Architect.*

Curious Suit About a Statue. — A special to the New York *World* says: Clark Mills, the sculptor, is having trouble over the equestrian statue of Jackson, cast in the same mold as those at New Orleans and Lafayette Square here, which he has agreed to erect upon Capitol Hill, Nashville, next month. The statue is on his country place, which is leased to J. G. Garland. When Mr. Mills attempted to remove it a few weeks ago, Garland procured an injunction restraining him. This was dismissed by the court, but another was immediately filed reciting that Garland had leased the place as a country resort, and that the bronze was the principal attraction. Mr. Mills put in a counter claim that, although he had leased the place at $20 a month, he had not been able to collect rents for several months, and that, moreover, there was no provision in the lease respecting the bronze. Mr. and Mrs. Garland thereupon brought two suits against Mr. Mills for trespass, fixing the damages, respectively, at $95 and $90. The matter rested there until yesterday, when Mr. Mills applied to police head-quarters for two officers to accompany him to Garland's within a few days for the purpose of enabling him to remove the bronze unmolested.

The London Times on the Monroe Doctrine.—The London *Times* in an article on the Panama Ship Canal, says: "The Monroe doctrine, even in its most restrictive shape, has never been admitted into the law of nations. Certainly no such extreme interpretation has yet been attempted to be fastened upon it by Americans as it is made to bear in President Hayes's message to Congress and the resolution of the select committee of the House of Representatives. According to these two statements, had the Colombian Confederation itself taken charge of the project, the United States would have been justified in prohibiting the work. That the United States, by furnishing the money, should obtain a special right to watch over the safety and peaceful use of the new channel, is what Europe, and particularly Great Britain, would most of all desire; but the world is entitled to ask the United States to make up their mind either to let M. de Lesseps do the thing himself with the resources at his command, or to charge themselves with the task."

Foundations for Machinery. — Mr. W. H. Delano, in a paper read before the British Institution of Civil Engineers, spoke of the use of asphalt for the foundations of machinery, notably for those running at high speeds, the asphalt having the valuable quality of absorbing vibrations. This was instanced in the case of a Carr disintegrator, which, being mounted in a pit lined with bituminous concrete, was worked at 500 revolutions per minute without sensible tremor, whereas, with the former wooden mountings on an ordinary concrete base, the vibration was excessive, and extended over a radius of 25 yards. In the Paris Exhibition of 1878 there was shown a block of bituminous concrete, weighing 45 tons, forming the foundation of a Carr disintegrator used as a flour-mill, and making 1,400 revolutions a minute, a speed which would have been impracticable on an ordinary foundation. Extensive applications of the material for this purpose are made in France, especially in connection with steam-engines and steam-hammers.

The Churches of Paris. — *Le Technologiste* states that there are in Paris sixty-four churches, ten temples, two synagogues, seven Protestant churches, and three consistorial establishments. The value of the buildings belonging to the Catholic faith amounts to $39,804,705; the value of those owned by the Protestants is $1,907,577; while the Jewish synagogues are valued at $888,597, which makes a total value of $42,600,879. To this is to be added $1,223,268, — the value of painting, sculptures, stained glass, and other objects of art.

A Floating Railway. — The latest plan for crossing the dreaded English Channel is embodied in a model now before the Admiralty for a monster floating railway-station, which is to carry trains across the Channel at the rate of fourteen knots an hour. It is stated that "each train would provide accommodations for 2,000 passengers," which would require sixty or more railway-carriages.

The English and the Maoris. — A competitive examination of five English children and five Maori children, held recently, shows that Macaulay's New Zealander will probably be a very intelligent archæologist, and will be able to put two and two together perhaps more readily than Dr. Schliemann. The investigation showed that while the English children could read better, the Maoris could write better; that the Maoris were better grammarians than the English; while in arithmetic the Maoris answered twenty-two out of thirty questions, and the English children could answer only fourteen.

The Personnel of the Paris Sewers. — About five thousand men are regularly employed in the sewers of Paris.

The Dangers of the Panama Canal. — Mr. Robertson, of Louisiana, has discovered the true aim of M. de Lesseps and his fellow-schemers, and has invoked the aid of Congress against their infamous designs by introducing the following resolution:

Whereas, The warm stream of the Atlantic before entering the Gulf of Mexico, strikes against the eastern coast of the Isthmus of Panama, and would continue to the Pacific but for the existence of that narrow barrier; and

Whereas, After leaving the Gulf it flows across the Atlantic past the coast of Great Britain, creating the temperate climate of that country, which otherwise would have the cold climate of Labrador; and

Whereas, It is an admitted scientific fact that a tide-level canal of sufficient width across Panama would change the course of the Gulf Stream, and thereby freeze out an English-speaking nation; and

Whereas, The United States would thereby lose its chief foreign market, which loss would not be counterbalanced by the new markets opened by an inter-oceanic canal; therefore

Resolved, That we emphatically reaffirm the Monroe Doctrine, and that we will bring it to bear against the inhuman designs of France in thus attempting to destroy her chief European rival, and injure the commerce of the United States.

We may now expect to see the English-speaking nation converted to the Monroe doctrine.

Rubens. — A committee report just presented to the Municipal Council of Antwerp contains the following particulars about the works of Rubens. Altogether Rubens produced 2,719 works of art, among which 228 were sketches and 484 drawings. Of all these works, 829 have never been copied, 690 are only known by copy, and 294 seem lost. To possess as complete as possible a collection of the master's works, the city of Antwerp will have to obtain copies of 536 pictures and to collect 921 engravings. The cost of a complete Rubens collection, such as was recommended by the Artists' Congress in 1877, would amount to 30,000 francs, and this sum has been voted by the Municipal Council and the Belgian Government. Surely, however, this sum must be inadequate.

A French Crystal Palace. — A scheme to build a magnificent Crystal Palace on the ruins of the Palace of St. Cloud is, the *Figaro* asserts, under consideration by the French Government. It would be surrounded by a model farm and a botanical garden, with conservatories and an aquarium, and would contain a museum, library, gymnasium, observatory, and galleries for art exhibitions. The cost is estimated at 15,000,000 francs.

Russian Barracks. — A range of barracks, which are the largest buildings of the kind in Russia, and perhaps in the world, has been lately completed at Moscow. The facade is 3,500 feet long, and the blocks are all three stories high. Separate blocks — connected by corridors — are provided for the accommodation of the men, for instructional and drill purposes, for sick quarters, and for the officers. The rooms for the men are of large size, the ceilings being supported on light iron pillars, with windows on both sides, while all parts of the buildings are provided with very perfect arrangements for warming them by means of hot air, and also for insuring adequate ventilation. Each company has a mess-room separated altogether from the sleeping-room of the men, and a large and commodious kitchen. Water is carried throughout the building. In a separate block rooms are set apart for officers' clubs.

Mr. Ruskin's Sheffield Museum. — The proposal to raise a shilling subscription with which to enlarge Mr. Ruskin's museum has been received with great favor, says the London *Times*. It was Mr. Ruskin's intention to have borne the expense himself, but now that will be unnecessary. A rough plan has been prepared by Mr. Ruskin of what he would like; but whether it shall take the form of a new wing or a separate gallery has not yet been decided. Mr. Ruskin intends to place in the new building rare prints, pictures, casts, and sculptures. The casts are from celebrated pieces of sculpture at the angles of the Ducal palace, and also St. Mark's Cathedral in Venice, which were taken at Mr. Ruskin's own cost by the permission of the Italian Government. They have not yet been seen by the public. The style of sculpture varies from the Ninth to the Fourteenth Century. Mr. Ruskin has also commissioned an artist to paint the west front of St. Mark's Cathedral at a cost of £500; and the picture, it is expected, will be placed in the new gallery.

A Peruvian Bronze Statue. — At the last meeting of the Académie des Inscriptions, at Paris, M. Léon de Rosny stated that a bronze statue, the head surrounded by a solar aureola, had been found in an Indian burial-ground at Trujillo, in Peru. The inscription on it is, in M. de Rosny's opinion, undoubtedly Chinese, but of an archaic character, and may signify "He who governs the Kingdom." If this be authentic, it would point to intercourse between China and the ancient Peruvian Empire.

Natatorium. — Work is progressing rapidly on the new Natatorium on Howard Street, Baltimore, Md., which will measure 68 feet by 248 feet. The swimming pool will be 40 feet by 140 feet, and from 3 feet to 10 feet 6 inches deep. The walls of the pool will be built of Falls-road stone, 4 feet thick at the bottom, and 2 feet 6 inches at the top; the whole is cased and lined with a nine-inch brick wall laid in Portland cement, making the total thickness of wall 4 feet 9 inches. The bottom of pool will be puddled with 12 inches of puddling clay, over which are two layers of brick, the whole being lined with Portland cement. The water will be kept a uniform temperature of 80° in summer and 75° in spring and autumn, by means of boilers placed in the basement of the building. The entire cost will be $60,000. Messrs. Dixon and Carson are the architects and superintendents.

A Relic of the Tay Bridge Disaster. — One of the cars of the Edinburgh & Glasgow Railway which fell from the Tay Bridge, was picked up by fishermen on the western coast of Norway.

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BUILDING INTELLIGENCE.

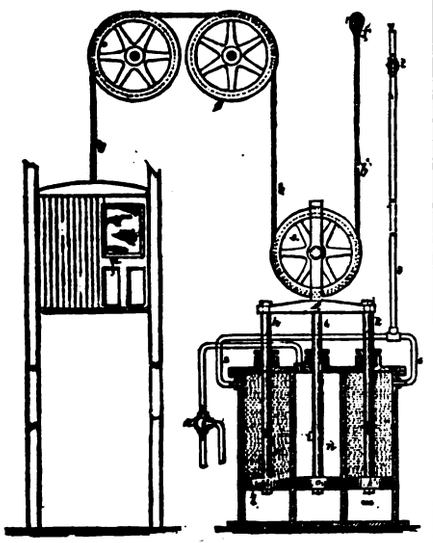
[Reported for The American Architect and Building News].

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

224,574. ELEVATOR.—Seth H. Bevins and William H. Phillips, New York, N. Y. The car, of any desired character, is raised and lowered by a wire rope, *b*, passing over the pulleys *c d*, and below the pulley *e*, and then led up to the fixed attachment *f*. The head-block *g* is connected with the pulley *e*, and to it three



piston-rods are connected to insure a parallel movement and a proper distribution of the forces applied to the car. The piston-rods *h* and *k* pass into the cylinders *l* and *m*, and are provided with the pistons *h' k'*, and the piston-rod *i* passes into the cylinder *n*, and is provided with the piston *o*. Steam under pressure is admitted above the piston *o*, and is regulated by a valve. The cylinders *l* and *m* are supplied with water by the pipes *s*. *t* is a valve or cock to open or close the pipe *s*, and is operated from the elevator. At the same time the cock *r* is operated in the following manner: The column of water and its pressure upon the pistons *h'* and *k'* need not be sufficient to sustain the car when empty. Hence when the valve *t* is open the car will descend and force the water out of the cylinders *l* and *m*, up through the pipe *s* into the tank or reservoir, and when the cock *t* is closed the water will be held so that the car remains immovable. When the car is to be raised the valve *r* is opened simultaneously with the cock *t*, and the pressure of steam in the cylinder *n* forces down the piston *o* and raises the car. This motion, however, is partially controlled by the extent to which the valve *t* is opened to admit water, because the car cannot move faster than the water flows into the cylinders *l* and *m* without producing a vacuum that the steam pressure could not overcome. When the car is to be held, the steam is shut off, and the valve *t* closed. When the car is to descend the valve *r* closes the steam-inlet and opens the exhaust, and the valve *t* is opened to whatever extent is desired for speed of movement. If desired, steam may be admitted to the cylinder *n* beneath the piston to increase the speed of the descending car and force the water back into the reservoir.

225,921. LATHE.—James Davies, and Foster B. Chidester, Jersey City, N. J.

225,945. BRICK OR BUILDING-BLOCK, AND METHOD OF LAYING THE SAME.

225,946. FORCE-PUMP.—Henry Reece, Lincoln, Neb.

225,963. WATER-METER.—Charles H. Bacon, Boston, Mass.

225,969. SASH-CORD GUIDE.—Frank S. Clarkson, Baltimore, Md.

225,980. HINGE.—David A. Green and James H. Roberts, Rushville, Ind.

225,991. COMPOUND FOR ARTIFICIAL STONE.—Archibald K. Lee, Philadelphia, Penn.

225,995. BRICK AND TILE MACHINE.—James W. Penfield, Willoughby, Ohio.

226,011. COMMODE.—William J. Winghart, New York, N. Y.

226,023. WATER-METER.—Albert Borklet, Cincinnati, Ohio.

226,033. SASH-FASTENER.—Charles M. Burns, Jr., Philadelphia, Penn.

226,042. LOCK-HINGE.—Matthew S. Cummings, Philadelphia, Penn.

226,043. DRILL.—John L. Bryant, Hillsdale, Mich.

226,045. SHUTTER-WORKER.—Henry J. Dickerson, Appleton, Wis.

226,056. LATHING AND PLASTERING.—Walter J. Garvey, St. Louis, Mo.

226,074. CHIMNEY-FLUE AND SHIELD.—Andrew T. Jackson, Cotton's Store, Ala.

226,075. TRY-SQUARE.—Horace Johnson, Crittenden, N. Y.

226,077. ELEVATOR.—Benjamin B. Keyes, Chelsea.

226,100. ELEVATOR.—Charles R. Otis, New York, N. Y.

226,101. EXTENSION TOWER.—Daniel M. Pfantz, Philadelphia, Penn.

226,123. KNOB-ATTACHMENT.—Alpha M. Smith, Tampico, Ill.

226,130. SCROLL-SAW.—Delay F. Sutton, Rochester, N. Y.

226,139. EASEL.—Isaac Wilkins, Jr., Green Point, N. Y.

226,147. SASH-HOLDER.—Jacob B. Teagley, Indianapolis, Ind.

9,130. HOLLOW AUGUR (*Re-issue*).—Weston Smith, Three Tons, Penn.

9,131. Same.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS.—Since the last report thirty-three building permits have been issued, but the following, only, are of sufficient importance to be mentioned:—

Anthony Wahl, three-st'y brick building, 263 Gay St., between Matt and Aisquith Sts.

John Black, 2 three-st'y brick buildings on High St., between Helen and Gay St.

John Black, three-st'y brick building on Aisquith St. near Paint Lane.

John Maxwell, addition to dwell., Calvert St., between Franklin and Centre St.

Jacob Heinmiller, addition to dwell., 104 Myrtle Ave., between Hoffmann and Dolphin Sts.

Christian Muhly, 2 three-st'y brick buildings, 391 and 393 Charles St.

Nathan Frank & Sons, four-st'y warehouse, Milliken St., between Spring and Eden Sts.

Casper Wolf, 2 three-st'y brick buildings, on Camden between Sharp and Hanover Sts, each 16'6" x 62'.

Henry Plack, 2 three-st'y brick buildings, cor. George and Fremont Sts.

A. A. Rheinhart, 7 three-st'y brick buildiugs, Bolton St., commencing at cor. of Lawrence St.

Messrs. Sharp & Dohme, four-st'y brick and iron warehouse, 267 Pratt St., between Howard and Eutaw, 18' x 70'.

Mrs. F. W. Bennett, three-st'y dwell., 28 S. Mulberry St., near Charles St.

R. W. Baldwin, a four-st'y brick and stone warehouse, cor. Harvard and Lombard St.

ASYLUM.—The Trustees of Bay View are asking for an appropriation of $50,000, to construct a new building in addition to the present buildings. The trustees state that the present accommodations are entirely inadequate, and that it is necessary that they should have a new building.

HOUSE.—Messrs. Dixon & Carson are the architects for two suburban residences now building for Mr. Mr. Eugene Poultney and J. I. Middleton, of Baltimore. Cost, $4,000 each.

HOUSE OF CORRECTION.—An appropriation of $40,000 has been made to the House of Correction, $20,000 of which is to be expended in work-shops, roads, and drainage.

PIER.—The Northern Central Railway Company is to build a new steamship pier near the Canton Elevator, 120 by 400 feet, and a bulkhead 320 feet long will also be built. Messrs. S. H. and T. F. Adams are the contractors. Cost, $40,000.

TRUCK-HOUSE.—An ordinance appropriating $15,000 for a new truck-house in Northwest Baltimore has passed both branches of the City Council.

Boston.

BUILDING PERMITS.—Since our last report the building permits granted are as follows:—

Brick.—Franklin St., cor. Pearl Place, 1 store, 78' x 108', five stories; S. S. Woodcock, architect; A. P. Morse and H. B. Taylor, owners.

338 *Beacon St.*, for H. Stackpole, 1 dwell., 25' x 60', three stories; Webster and Dixon, builders.

2107 *Washington St.*, for May & Gardner, 1 dwell., 19' x 37', three stories; B. C. Dennet, builder.

Wood.—Quincy St., Ward 21, for C. Lathrop, 1 dwell., 27' x 31'; S. H. L. Pierce, builder.

Elm St., Ward 24, for D. Simonds, 1 dwell., 23' x 34'; C. A. Kirkpatrick.

Grand Junction Wharf, 1 freight-house, for B. & A. R. R., 58' x 447'; A. H. Glover, builder.

Washington St., for Metropolitan R. R. Co., stable, 62' x 112'; J. Quirk, builder.

P St., cor. E. First, for South Boston R. R., 1 storage of cars, 80' x 151'.

60 *W. First St.*, for Boston Machine Co., 1 shop, 52' x 90'; Holbrook & Harlow, builders.

Virginia St., Ward 20, for J. W. Smith and L. Covington, 2 houses, 24' x 32'; Gunn & Hutchings, builders; J. H. Besarick, architect.

Washington St., Ward 23, 1 dwell., 22' x 32'; A. F. Quigley, owner and builder.

Glendale St., Ward 20, for W. H. Sayward, 1 dwell., 28' x 34'.

Schuyler St., Ward 21, for W. E. Eaton, 1 dwell., 28' x 42'; J. W. Hill, builder.

Washington St., Ward 23, for I. H. Gray, 2 dwells., 19' x 29'; T. G. Tobin, builder.

Brooklyn.

BUILDING PERMITS.—*Stockholm St.*, 1 two-st'y frame dwell., 22' x 35'; cost, $2,200; owner, Henry Ropke, 320 Evergreen Ave.; builder, H. C. Bauer.

North Fifth St., No. 205, three-st'y frame tenement, 25' x 50'; cost. $3,900; owner, Peter Carel, on premises; builders, Ulrich Maurer and Michael Metzen.

Washington Ave., 2 three-st'y brown-stone dwells., 20' x 45'; owner and builder, William C. Bowers, 283 Lafayette Ave.; architects, Parfitt Bros.

Pulaski St., 4 two-st'y frame dwells., 15' x 32'; cost, $2,200 each; owner, W. Buskin; builder, John B. Cavanello.

Franklin Ave., 1 two-st'y brick shop, 25'6" x 32'; cost, $1,500; owner, Myron C. Rush.

Myrtle St., 1 two-st'y brick stable, 34' x 60'; cost, $4,000; owners, Meltzer Bros., Myrtle St.; architect, John Platte; builders, B. Rauth & Bro. and Jno. Rueger.

Pulaski St., 1 two-st'y brick stable, 50' x 100'; cost, $5,500; owners, Gluck & Scharmann, Pulaski St.; architect, J. Platte; builders, William Rauth and Jno. Rueger.

Seigel St., 1 five st'y brick factory, 100' x 50'; cost, $10,000; owner, Martin Worn; architect, Jno. Platte.

Seigel St., 1 three-st'y brick drying kiln, 25' x 30'; cost, $3,000; owner, Martin Worn; architect, J. Platte; builder not selected.

ALTERATIONS.—*Vine St., No.* 13, interior alterations; cost, $2,300; owners, Valentine & Bergen, 15 Fulton St.; architect, G. L. Morese; builder, J. Hart.

Willoughby St., cor. Adams St., front and rear walls altered; cost, $3,000; owner, James Howell, Adams St.; architect, W. A. Mundell; builder, B. Gallagher.

CONVENT.—An endeavor is making to secure the land bounded by Clinton, Waverley, Willoughby, and Myrtle Avenues as a site for a new Roman Catholic convent.

Chicago.

BUILDING PERMITS.—*Third Ave.*, freight depot, 60' x 351', for the Chicago and Western Indiana Railroad Company; cost, $32,000.

Rucker and Huron Sts., improvements on Bethel Church; cost, $2,000.

Franklin and Randolph Sts., five-st'y warehouse for Field, Leiter & Co.; cost, $65,000.

Wood St., No. 392, three-st'y factory for Naman, Wanbrandt & Co.; cost, $3,600.

Western Ave. and Twelfth St., two-st'y dwell., for John Rusis; cost, $3,000.

Wallace and Thirtieth Sts., three-st'y public school-house; cost, $30,000.

New York.

BUILDING PERMITS.—*One Hundred and Thirty-sixth St.*, for S. A. McMurty, B. W. Warren, architect, 2 three-st'y brick dwells., 17'6" x 48', to cost $10,000.

596 *Lexington Ave.*, for Dr. T. G. Thomas, Silliman & Farnsworth, architects, D. C. Weeks & Son, builders, a six-st'y brick dwell., 25'7" x 90'; cost, $50,000.

38 *White St.*, for Thos. Thatcher, Jno. McIntyre, architect, 1 five-st'y brick store, 25' x 100'; cost, $30,000.

Eighty-fourth St., for Geo. W. Eggen, Chas. Kinkel, architect, Frederick Holdrick, builder, two-st'y brick store, 41' x 68', to cost $2,500.

227 *E. Fiftieth St.*, for Wm. B. Rockwell, A. B. Ogden, architect, 1 brown-stone and brick flat; cost, $13,000.

22 *Willet St.*, Henry Ruel, owner, Julius Boekel, architect, 1 brick tenement; cost $5,500.

CORRECTION.—The cost of the house for Mrs. C. L. Anthony, Mr. James Stroud, architect, was wrongly given in our last issue, as $2,000 instead of $20,000.

ALTERATIONS.—*Broadway, No.* 12, upper story to be raised, also internal alterations; cost, $4,000; owner, A. Newbold Morris; architects, McKim, Mead, & White.

Broad St., Nos. 78 *and* 80, new elevator and interior alterations; cost, $12,000; owners, H. H. Popham & Co.; architect, Stephen D. Hatch.

Avenue A, No. 229—new front wall and store-front; cost, $1,100; owner —— Mayer; architect, Jobst Hoffman.

John St., No. 42, to be raised to five stories; cost, $2,000; owners, C. E. Larned and Reuben Ross.

Crosby St., No. 90, interior alterations; cost, $2,000; owner, John Simpson; architect, John B. Snook.

Madison Ave., No. 118, five-st'y brick extention on rear, 25' x 38', also interior alterations; cost, $16,500; owner, William Bond; architect, Arthur Gilman; builder, James Thompson.

Fifth Ave., No. 149, stable, two-st'y brick extension; cost, $2,400; owner, Bradish Johnson; architects, D. & J. Jardine; builder, Samuel Lowden.

Madison Ave., No. 540, two-st'y brick extension on rear, 14' x 25'; cost, $2,500; owner, S. J. Drake; architects, D. & J. Jardine; builder, Bartlett Smith.

Grand Boulevard, to be raised to three stories, also one-st'y brick extension, 21' x 17'; cost, $3,800; owner, Mrs. S. F. Chalfin; architect, L. J. O'Connor.

Hester St., cor. Allen St., new store front; cost, $4,000; owner, Mrs. Mary Boyle; builder, James Doig, Jr.

Bridge St., No. 20, one-st'y brick extension; cost, $2,000; owner, John Schermerhorn; builder, D. McLeod.

Liberty St., No. 89, damage by fire to be repaired; cost, 2,400; owner, estate of Uriah J. Smith; builder, Elward Smith.

Eighth Ave., Nos. 205 *and* 207, front wall to be rebuilt, also internal alterations; cost, $3,000; owners, Ph. and Wm. Ebling; architect, A Pfund.

ACADEMY OF MUSIC.—At a meeting of the stockholders last week it was proposed to build a new Academy "up town," but, after deliberation, it was decided to enlarge the seating capacity of the present building, and one of two plans submitted will probably be acted on.

FACTORY.—Mr. George B. Pelham has prepared plans for a factory and warerpoms for Messrs. Decker Bros., the piano manufacturers.

HOUSE.—Interest is felt in the erection of the house on Fifth Avenue, corner of Thirty-fifth Street, which is being built for a daughter of Wm. Astor. Not only the style but the materials are new to Fifth Avenue. The first story is of brown-stone in the rough; above, the front is of brick, with hammered brown-stone finish. The style is severe and simple, in the early Italian Renaissance style. The cost is estimated at about $80,000. Messrs. McKim, Mead & White are the architects.

OFFICE-BUILDING.—The Liverpool, London and Globe Insurance Co. have accepted the plan of Mr. S. D. Hatch for their new building.

STOCK EXCHANGE.—The building Committee of the Stock Exchange invited Mr. R. M. Hunt, Mr. R. H. Fenwick, Mr. N. Le Brun, Mr. Arthur Gilman, and Messrs Peabody & Stearns to submit designs for

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their new building. Mr. Le Brun has not put in designs, and the Committee are yet undecided which plans to accept.

Store. — Messrs. D. & J. Jardine have drawn plans for a five-story store, 25 by 200 feet, No. 370 Broadway. The front is to be of brick with stone finish.

Milwaukee.

Building Permits. — The following building permits have been issued since our last report: —

Henry Buertrin, Wisconsin St., frame dwell.; cost, $3,700.

Mr. Kielin, Fourth St., frame dwell.; cost, $1,450.

C. J. Donaldson, Hanover St., frame dwell.; cost, $3,400.

B. J. Donaldson, Mineral St., frame dwell.; cost, $1,550.

G. Templin, Second Ave., 2 frame dwells.; cost, $7,000.

T. A. Chapman, Cass St., additions to dwell.; cost, $2,500.

C. Schuchknett, East Water St., brick store; cost, $5,000.

Alex. Mitchell, Third St., augur-bit factory; cost, $2,500.

Philadelphia.

Armory. — The First Regiment National Guard has bought a site for its new armory at the corner of Broad and Callowhill Sts. The building will cost about $120,000.

Building in March. — The total number of permits issued during March was 482, an increase of 98 over those issued during the corresponding month, 1879, their character being as follows: —

Alterations and additions, 98; back buildings, 55; two-story dwellings, 124; three-story dwellings, 126; one-story stores and dwellings, 8; two-story stores and dwellings, 4; three-story stores and dwellings, 15; four-story stores and dwellings, 3; five-story stores and dwellings, 3; factories, 13; stables, 18; hall, 1; shops, 8; engine-houses, 2; boiler-house, 1; offices, 6; depots, 2; school-house, 1; store-houses, 2; dye-houses, 2; dry-houses, 2; picker-houses, 3; packing-house, 1; brewery, 1; public house, 1; hotel, 1; kiln-house, 1; and 1 library.

Cathedral. — The Cathedral of St. Peter and St. Paul is to be completed in accordance with the original design of the architects, Messrs. Le Brun and Runge.

Store. — A four-story brick and iron store, 24 by 286 feet, will be built at 718 Market St., for Messrs. Schwartz & Graff.

Providence, R. I.

House. — Mr. John A. Bennett is building a frame dwelling at the corner of High Street and Baker Avenue. Cost, about $8,000. Work to be done by the day. No architect.

Office Building. — Mr. Caleb G. Burrows is about to build a brick and stone block on High Street, to contain stores, offices and hall, at a cost of about $23,000; architect, C. F. Wilcox; contractors, for the mason's work, John Briggs; carpenter's work, John K. Harris.

Store. — George H. Slade and wife will build a four-story brick block, corner of Eddy and Washington Streets. Clifton A. Hall, architect. Cost estimated at $45,000. Foundations are being put in by day work.

Oakland, Cal.

Houses. — Mrs. Ketler is building two frame houses. Cost, $3,600 each. S. and J. Newsom are the architects.

Market-House. — Mr. Potter proposes to build a new market-house between Thirteenth and Fourteenth Streets. It will run through the block from San Pablo to Broadway.

Store. — Smith & Doe are building a one-story brick building. Cost; $3,500.

St. Louis.

Building Permits. — Forty-four permits have been issued for the week ending April 2, 1880. Twelve of these are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows:—

Owners.	Use.	Stories.	Rooms.	Cost.
City of St. Louis.	Engine House.	4	3	$5,000
William T. Semp.	Cooling & Ice-H'se.	3	3	100,000
B. F. Young.	Dwelling.	3	8	5,000
Collier White L'd Co.	Elevator.	1	6	6,000
C. S. McManus.	Store and Rooms.	3	10	5,000
Helen A. B. Corton.	Dwelling.	3	20	10,000

General Notes.

Amherst, Mass. — The new hotel, corner of Broadway and Amity Streets, is now nearly completed; it measures 90 by 103 feet, and is of brick and stone. Cost, $30,000. Esty & Hurd, of Boston, architects.

Binghamton, N. Y. — E. P. & C. B. Smith are building a brick block on Court Street. It will be 40 by 140 feet deep, four stories above the basement. William D. Stephens, contractor.

Geo. L. Crandall has commenced work on a building on Commercial Avenue, which is to be 43 by 60 feet, three stories above the basement, to be built of brick. T. I. Lacey, architect, for both buildings.

There is a great deal of activity in the building business this spring.

We are to have a new depot for the Erie and Western Railroad, 180 feet long, built of brick. Design by a New York architect.

Boone, Io. — Mason Bros. are building a store, 24 by 90 feet.

Calverton, Md. — The corner-stone of St. Edward's Catholic Church was laid last week. Mr. Edward Brady is the architect. Cost, $8,000.

Clinton, Mass. — The house for Mr. H. M. Bigelow is being entirely remodelled, at a cost of $5,000. Messrs. Esty & Hurd, of Boston, are the architects.

Greenville, O. — One of the capitalists of this town, J. W. Spayd, expects to build at least fifty dwellings this summer.

Lake Bluffs, Ill. — The Northwestern Railway Company proposes to build a new depot for the association.

Lexington, Ky. — Clay, Tar & Co. are building a large warehouse on the Frankfort Pike.

Louisville, Ky. — W. C. Arterburn, seven one-story frame dwellings on Twentieth Street, between Madison and Chestnut Street. Cost, $3,200.

The Cave Hill Cemetery Company, a two-story brick and stone building at the cemetery gateway. Cost, $12,860.

Mrs. Zinsmeister, a one-story brick dwelling, corner of Twenty-second and Grayson Streets. Cost, $1,500.

Medford, Mass. — Corner of Main and South Streets, is to be built a fire-engine house of brick and free-stone, measuring 60 by 70 feet, with tower 14 feet square and 96 feet high, in the "Queen Anne" style. Cost, about $14,000. The architects, Messrs. Wait & Cutter, of Boston, are now ready for estimates.

New Bedford, Mass. — The Grace Church Society has raised $15,000 towards building a new church.

Newport, R. I. — Arthur B. Mumford is building on School Street, a two-story dwelling house. J. D. Johnson builder.

Dudley Newton, architect, is building for his own use a cottage on Division Street. J. D. Johnson, contractor.

Pawtucket, R. I. — Benjamin Smith, carpenter and builder, is building for himself a house, at a cost of about $4,000. Plans furnished by Walker & Gould, of Providence, R. I.

Workmen are clearing the site for the new opera-house on Main Street.

Pittsburgh, Pa. — Mr. E. M. Butz, architect, is building a large store for Gen. Moorhead on Liberty St., and another large building for Mr. Edward Gregg.

Rushville, Ind. — Mr. D. A. Bohlen of Indianapolis is the architect of the new church which is building at a cost of $8,000.

Russell, Mass. — A new school-house is to be built at Salmon Falls.

Saco Ferry, Me. — A new church, 30 by 50 feet, is about to be built here. The foundation has been put in.

San Francisco, Cal. — The repairs and alterations of the Old City Hall have cost $17,841.72, although the original contract called for the expenditure of $1,040.

Santa Fe, U. T. — A $6,000 theatre is to be built here.

Scituate, Mass. — The foundation for the Unitarian church will be ready for the sills by the the 1st of April.

Shelton, Conn. — Mr. Wm. Wilkinson is building a wooden house for himself, costing $8,000. Plans by Brown & Stilson, of New Haven.

Radcliffe Bros. are about making an extensive addition to their mill, from plans by C. T. Beardsley, Jr.

South Reading, Pa. — Work has begun on a new hotel, to cost $30,000.

St. Paul's, Minn. — A new three-story building will be built this season on West Ninth Street, for St. Joseph's Orphan Asylum.

Thomastown, Conn. — Messrs. Plum & Atwood are building a brass mill, 60 by 172, of brick. — Mr. Aaron Thomas is building a frame house on Orchard Street, costing $2,500, from plans by Robert W. Hills, of Waterbury, Conn.

Towsontown, Md. — Work on the Sheppard Asylum has been resumed.

Turner's Falls, Mass. — The Methodists are preparing to build a new church.

Vincennes, Ind. — The new opera-house is under the charge of Mr. J. H. Stem, architect, of Indianapolis. Mr. Stem is also building a house for Mr. Samuel Gimble, which will cost $8,000.

Wabash, Ind. — The new County Jail will cost $17,000.

Wallingford, Conn. — A brick church is being built here by the Catholic society, to be called the Church of the Holy Trinity, costing about $50,000. Plans by Messrs. Brown & Stilson, New Haven, Conn.

Wallace Bros. are about building an addition to their factory of brick, costing $7,000. Brown & Stilson, architects.

Washington Court-House, O. — J. F. Ely will rebuild his elevator that was burned a week ago.

Waterbury, Conn. — Mr. W. E. Risley will build a house and barn, and Mr. E. A. Pierpont is to commence a fine house. Palliser, Palliser & Co., architects, Bridgeport, Conn.

Wapakoneta, O. — Thomas Moss and C. F. Herbst are each preparing to erect new buildings on Auglaize Street.

Westfield, Mass. — The Episcopal Society is negotiating for a site on the corner of Washington and King Streets, for a new chapel.

Wickford, R. I. — Mr. Robert J. Fitch has commenced to build a two-story dwelling house on Union Street. Mr. Sanford B. Monroe, builder.

Winsted, Conn. — Mr. Robert W. Hills, of Waterbury, has just completed the plans for a three-story frame block, 70 by 70 feet, for the Winsted Real Estate Co., costing about $8,000.

Wolcottville, Conn. — The Congregational Society are about building a chapel of wood. Robert W. Hills, of Waterbury, architect.

Yantic, Conn. — Winslow Williams has foundations in for a house 105 by 60 feet; first story granite; shingle work above; slate roof. Cost, $25,000. H. B. Beardslee, of Milford, builder. Palliser, Palliser, & Co., architects, Bridgeport, Conn.

Industrial.

Bainbridge, Ind. — Messrs. Dooley, Gordon & Co., will this season build a flour and grist mill.

Bellaire, O. — Beazle, Moore & Co. will very soon break ground for their new foundry and machine shops.

Beverly, Mass. — Lorenzo Barker is building a tobacco shop, 170 by 51 feet, and five stories high.

Clinton, Mass. — The Wire Cloth Company is to build a new mill, 150 by 56 feet, for weaving, a new blacksmith's shop, and an additional 36 feet to the side of the present tower.

Danbury, Conn. — Foster Bros., are soon to build a hat factory. The main building is to be 130 by 26 feet, three stories high; the make shop, 60 by 20 feet, one story; the coloring shop, 50 by 20 feet, one story; the hardening shop, 40 by 20 feet, two stories.

Dayton, O. — The ground has been broken on First Street, corner of Madison, for Pinneo & Daniels' new wheel works. The building will be of brick, four stories high, and 50 by 150 feet.

Higganum, Conn. — The Russell Manufacturing Company is building a building, 40 by 100 feet.

Houlton, Me. — Kinney & Watson are building a starch factory, the main building, 50 by 80 feet, and two dry-houses, 30 by 60 each.

Holyoke, Mass. — Munn & Baush, are to build a machine shop, 80 by 35 feet.

Laconia, N. H. — H. H. Abel is building a large machine shop on Lake street, while F. P. Holt will soon build an addition to his hosiery mill.

Middletown, O. — The Tytus Paper Company is building a new bleach house.

New Bedford, Mass. — The foundation wall of the new silver-plating works at the east end, where it it crosses the shore, is nearly comleted.

New Brighton, Penn. — The foundation for the new Novelty Works has been commenced. The foundry is to be a brick building, 40 by 160 feet.

Pawtucket, R. I. — The Conant Thread Company are building an addition, ninety feet long, to their "No. 2" mill.

The new American File Works is building a machine shop, 35 by 125 feet.

Philadelphia, Pa. — Horner Bros. are building a very large factory at the corner of Fourth Street and Lehigh Avenue.

Portsmouth, N. H. — The Portsmouth Shoe Factory Company and the Whitcomb Shoe Manufacturing Company, of Mechanic's Falls, Me., have consolidated, and will build a factory here, 160 by 42 feet.

South Abington, Mass. — Miller Cook, Jr., is to build a boot and shoe factory, at a cost of about $6,000.

South Gardiner, Mass. — S. Bent & Brothers are building a new factory, the main part to be 54 by 40 feet, two stories high, with basement.

Sutherland Falls, Vt. — A building, 58 by 105 feet, is to be built by the Sutherland Falls Marble Co.

Troy, N. Y. — G. B. Cluett, Bro. & Co., are to build a new shirt factory.

Versailles, Ky. — Nathan Harris is building a malt house, 65 by 120 feet.

Verona, Pa. — A new glass factory is building at Verona Station, on the Allegheny Valley Railroad, by John Agnew, of the Southside.

Waterbury, Conn. — The Waterbury Brass Co. is building a brick mill, 125 by 75 feet.

Blake & Johnson are building a machine shop of brick, three stories, 93 by 60 feet.

Benedict & Burnham are building a brass-mill, 35 by 94. The Waterbury Clock Co. are building a frame factory, three stories, 85 by 36 feet.

West Auburn, Me. — James Munroe & Co. are to build an addition to their shoe factory, 85 by 36 feet, 3 stories, with a boiler-house attached, 29 by 21 feet.

Bids and Contracts.

Bellefontaine, O. — John Rouzer, of Dayton, has the contract for the new building of the Opera Block Co.

Boston, Mass. — The Boston Water Board has awarded the contract for furnishing brass, iron and composition castings needed by the Cochituate and Mystic departments, to the Davis & Farnum Manufacturing Company, of Waltham, at three cents per pound; the only other bidders being the South Boston Iron Company, at three and one-half cents per pound.

Charlestown, W. Va. — The State Board of Public Works has awarded the contract for building the new State Capitol to H. H. Shephard, who built the present Capitol in Wheeling. The building will probably cost a quarter million. The present letting calls for $150,000. The building under contract must be finished May 1, 1884.

Greenfield, Mass. — The Greenfield Power Co. have given the contract for their new building to Pierce & Austin.

Newbuyyport, Mass. — The contract for the new Ocean Mill has been awarded to Hon. Albert Currier.

New York, N. Y. — The Collins company of Blue Hill, Me., has the granite contract for the United States Barge Office.

The contract for the office buildings for the Astor estate, Nos. 21 and 23 West Twenty-sixth street has been awarded to Messrs. D. C. Weeks & Son for $60,000.

Patriville, Ind. — John Walker of Aurora, Ind., is furnishing the brick for Mr. Jacob Harris's house.

Philadelphia, Pa. — The public buildings commissioners have let the contract for brick for the interior work for this year to the Excelsior Brick and Stone company.

Providence, R. I. — The contract has been taken by Moulton & Ingraham to build a large brick and stone block for William Grovesner, on Eddy Street, near Broad. The architects are Messrs. Stone & Carpenter. Cost, about $18,000.

Springfield, O. — The contract has been awarded for building the new Western School-House, the total cost to be $13,413.45.

St. Louis, Mo. — The contract for the iron work on the United States custom-house has been awarded to the Phœnix Iron Co. of Trenton, N. J.

Versailles, Ky. — Matthew Jett, of Frankfort, has the contract for building the new court-house. Amount, $11,795.

Waterbury, Conn. — The contracts for Mr. Tucker's house is let. C. H. Fogg, carpenter; M. Rigney, mason, Bridgeport, Conn.; T. M. Walker & Co., sash and doors, Springfield, Mass.; Bennett & Eadie, mantels and interior work, Bridgeport, Conn. Geo. M. Lany, slating and terra-cotta, Bridgeport, Conn.

Williamantic, Conn. — The contract for building-marble for Shea's new block has been awarded to the Sutherland Falls Marble Co.

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SOME progress has been made toward the decision of the question whether the New York elevated railroads will have to pay damages for injury to property in the streets through which they pass, by the decision of the General Term of the Superior Court in the case of Dr. Caro, a resident of West Fifty-third Street, through which the Metropolitan road runs, who found his house darkened and the upper rooms rendered uncomfortable by the smoke and noise, and claimed that the nuisance should be abated. The Special Term decided against him, but the new decision reverses the first. The railroad company does not deny that the plaintiff's property is depreciated in value, but claims that its charter, permitting it to use the streets, protects it from liability for the necessary injury to private convenience. This the Court does not admit, quoting the precedent of the Cohoes Canal Company, which was compelled to pay damages for injury done by some blasting on their line, although their charter allowed them to excavate their canal by such means. We should think the analogy between the cases was not quite perfect, but undoubtedly the whole matter will be appealed. Some incidental matters have a little interest. Dr. Caro applies to the Court, not for damages, but for an injunction to prevent the running of trains, making the assertion, which is not denied by the defendant, that the company is insolvent, and unable to pay any judgments for damages which might be recovered against it, that all its property is mortgaged far beyond its value, and that any execution against it would be idle and fruitless. This may serve as a hint to those who think it would be easy to collect damages for injury to private property by future roads. The other New York company, which runs through Third Avenue, has taken a lease of that avenue from the city, so that any damage to abutting property would have to be paid by the city which gave the lease, and not by the company; a still less hopeful prospect for the injured ones, we should say. Nevertheless, it seems clearly equitable that, if the company's charter is drawn so unfortunately for the rights of property-owners as to relieve the company of responsibility for the injury it does, the city which gave the charter should be firmly holden to make good the injury. There are so many ways in which corporations can slip out of their obligations, that such matters should be carefully looked after by those who will be affected, before a charter is given.

THE Philadelphia elevated railroad, which is now building by the Pennsylvania Railroad Company, seems to run through houses as well as streets, and the corporation have had to condemn and pay for a large amount of real estate, in the same manner as a surface road. As usual in such cases, public attention is strongly drawn to the progress of the work, and the necessary demolitions give rise to many incidents. One woman, who owned a house on the line, had agreed to sell it, but through some informality the deeds could not be passed until the workmen engaged in clearing the route had reached the spot, and the proprietor refusing to give up possession, the house was taken down over her head. She sat, supported by some kindred spirits, in a second-story chamber until the ceiling over her had been removed, the partitions taken away, and the floor partly taken up; but finally abandoned the field, and submitted to use the carriage which the company kept waiting at the door to convey her to another dwelling-place. It is just reported that the city of Berlin has taken definite steps toward the construction of an elevated road through that large and rapidly growing city, and has appointed a commission of architects and engineers to consider the best route and the details of the work. Berlin is built on a sandy plain, little above the water level, so that the conditions will resemble those of several American cities, and undoubtedly there will be many interesting points of comparison between ours and the European methods of treating the subject.

PROFESSOR WM. RIPLEY NICHOLS, of the Massachusetts Institute of Technology, has been recently requested to examine into the sanitary condition of some of the Boston public school-houses, concerning which various unfavorable reports had been circulated, and his report is just published in pamphlet form. Professor Nichols has done good service before in the study of the air of school-rooms, and his investigations may be regarded as thorough, and his account of them trustworthy. As usual in "sewer-gas" excitements, he found little cause for apprehension; some local smells due to the imperfect character of the apparatus employed seem to have been mistaken for a general corruption of the school premises; but he takes occasion to comment upon the ventilation of the rooms. Owing, no doubt, to the gradual increase in attendance, the average condition of the air in the school-rooms is not so good as it was ten years ago, and Mr. Nichols expresses his opinion that some steps should be taken to remedy the evil. It is to be regretted that some means does not exist for determining organic contamination by itself, more calculated to impress the average mind than the present mode of taking the percentage of carbonic acid present as the index of other impurity. This is well enough for those who are accustomed to this mode of measuring, and to whom actual experience will suggest the kind of atmosphere which a given percentage of carbonic acid indicates; but the public are likely to forget the accompanying circumstances of organic contamination, and it is to be feared that unprofessional citizens, reading that air of the worst rooms in the worst schools contained only about two-tenths of one per cent of carbonic acid, a gas which is itself generally supposed to be but feebly noxious, will think that this is but a slender foundation for the demand for money to remodel their ventilating apparatus. Such persons may be profitably reminded that the actual state of contamination which such a percentage indicates is worse than that of most theatres during a performance, and about the same as that of an average railway passenger-car.

THOSE who desire the general use of the metric system of weights and measures should be gratified at the progress which their cause has made during the last year. The latest converts seem to be the physicians, and with them the druggists. A large number of medical societies have expressed their intention of adopting it in their transactions, and many recent books on hygiene and medicine use the metric notation. The British Medical Association has appointed a committee to consider whether the profession in that country shall adopt the same standard, but it is hardly necessary to predict that the report will be adverse. Meanwhile, however, the American doctors, having once obtained a taste of the order and simplicity of the Continental notation, as contrasted with the ridiculous jumble of Avoirdupois, Troy, and Apothecaries' weights; of grains which may be either sixtieths of a drachm or thirtieths of a drachm, "according to the context," of drachms which may be either sixteen or eight to the ounce, of ounces which may be either sixteen or twelve to the pound, will be unlikely to retrace their steps. Medicine is fast becoming an exact science, and it can no more afford to carry about and try to use in its literature the rusty tools handed down from half-a-dozen mediæval nations, than to operate upon its patients with dull and lumbering instruments. The great requisite for popularizing the metric notation is something to make the standard familiar to the young. Much has already been done, but much remains to do.

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It is unfortunate that the metre is so unwieldy a unit. A foot is easily measured by the eye, so is an inch, or a centimetre, but a yard is too large a unit for ready estimation except by practice, and the metre is still worse. Whoever will suggest a common object of nearly a metre in one dimension, can render a service to the cause of knowledge. Even so rude a standard as the ordinary city windows, which frequently measure very nearly a metre in width, would be easily carried in the mind. Perhaps city authorities would allow marks of a metre in length to be painted here and there on the curbstones, or lamp-posts might be banded at the requisite intervals: all such things would be of much use.

The records of the Boston Department for the Survey and Inspection of Buildings, which are carefully and systematically kept, reveal some interesting facts. As it happens, the first year of the existence of the Department was also that of the great fire, so that it is not surprising to find the number of permits issued during that year larger than in any since, though the number for 1874, two years after the fire, but a period of much speculation in suburban real estate, nearly equals it, and the list for 1871, the year before the fire, would not be far short. Since 1874 the numbers have very much diminished. As might be expected, the permits for brick buildings in the fire year, 1872, exceeded those of 1876, '77, '78, and '79 combined; but it seems that during the three months of 1871 in which the building law was in operation more structures of this class were authorized than in the whole of most of the years since 1874, and more than one-fourth as many as in 1872 itself, so that the great fire actually from the outset diminished the number, although it increased at first the magnitude of building operations. The Department keeps a record of losses by fire also, from which it appears that the value of property destroyed averages very nearly a thousand dollars per day in the years when no great conflagrations occur to double or triple the total in a single night. It is interesting to observe that although the aggregate loss varies much from one year to another, the number of fires has increased quite steadily since 1872, showing that construction has not greatly improved. There are, however, many signs of a better state of things in this respect.

The Metropolitan Museum of Fine Arts has already done something toward education, through the efforts of a number of the trustees and other gentlemen, who have established a fund for the support of a school of industrial art, and the school is now open at 31 Union Square, New York. Instruction is given in wood-work under the direction of Mr. A. Sandier, and in metal-work by Mr. Charles B. Atwood, both of whom are architects of recognized standing and attainment; and illustrations are drawn from the inexhaustible riches of the Di Cesnola and Avery collections. Thus far, the prospects of the enterprise seem encouraging. Forty-eight pupils are now in attendance, equally divided between the two instructors, and it is intended to add to the conveniencesn the school, and perhaps, another year, to the courses of study. It is found that a large proportion of the students are totally ignorant of drawing, and their instruction must therefore begin at the rudiments, so that the general progress of the class is delayed; but this trouble will cure itself by degrees. Strange to say, not one of the students of metal-work is, or is intended to be, an artisan in iron, brass or bronze; all of them will devote themselves to gold or silver work. Perhaps this is to be explained by the smallness of the demand for artistic products in the common metals, — a demand which is fostered almost exclusively by architects. The profession can do much to increase their influence by a more general interest in the subject. "Art metal work" is an expensive luxury; but a little care will often be able to search out well-designed stock patterns, and a demand for these will do much to encourage artistic feeling in the workmen who make them, and thereby improve the general taste.

A libel suit has been commenced by Mr. John Clifford, lately architect to the new City-Hall at San Francisco, Cal., against another architect, Mr. Wm. H. Drake. The plaintiff alleges that the defendant, with two other architects and a certain stone-cutter, impelled by professional jealousy, published an attack upon his character in a Chicago paper, which was copied into the San Francisco *Chronicle*, and led to his removal from his position. We know nothing whatever of the merits of the case, but it will do no harm to suggest that architects generally are often regarded by the public as being unduly ready to malign each other's work, if not their characters. Whatever value to an artist the honest criticism of his fellows may have, it is well to remember that the public reputation of a professional man is a part of his property, and courts have generally shown themselves disposed to require adequate compensation from those who thoughtlessly or maliciously infringe upon or lessen the value of that property; and if a just *esprit de corps* cannot be depended upon to inspire the members of a profession with a proper regard for each other's rights, it will do no harm to have it understood that worldly prudence must supply its place.

The labor troubles are fast vanishing. Practically, the workmen are selling their labor on a rising market, and although they take means of questionable prudence for influencing prices, they find it easy to make terms. The carpenters in New York have demanded, and have generally been granted, three dollars per day, an advance of fifty cents or more, and stone-masons and painters in other places have had their pay increased. The Lowell stone-masons, a sensible class of men generally, have given two weeks' notice of their intention to require higher wages, and expect to obtain it. It is hardly necessary to point out how much fairer such reasonable notice is to the employers than the sudden and violent demands for more money, purposely made when the master is distressed with contracts, and helpless, which some agitators try to make customary. Even boss mechanics are human, and the decent sympathy for their interests on the part of the men, which would, by suitable previous notice, enable them to complete their unfinished contracts without loss, and make their new ones intelligently, would be sure to be repaid by the greater willingness of the employers to raise the general standard of wages where such action did not mean ruin to themselves. The strange situation at Cohoes still continues, but a large number have yielded, and many individuals have applied for work, which could not be given them for want of the material which should have been furnished by the other departments of the mills, which are still on strike. This dependence of one department of a manufactory upon the others seriously complicates strikes. By means of it a few Fall River spinners were able to tyrannize over a whole town, and the extension of the principle upon which they acted may result in radical changes in manufacturing, probably not to the advantage of the operatives. It is said that the Cohoes work-people are beginning to be distressed. Four pianos have been taken from their houses for non-payment of instalments. This calls to mind the Sheffield situation of two years ago, when the prosperous steel-workers undertook to resist the depression of trade by the same senseless course of enforced idleness and wrong-headedness. There also pianos were first given up; a few months more of hopeless struggle, and the other furniture followed; and it was not long before the question became one of the necessaries of life. In that condition it still remains; their monopoly has passed into other hands, and the Sheffield cutlery workers will hardly see their pianos again in this generation.

We are interested to see how the move among the architects in regard to competitions is to result. The English papers this week seem to be silent on the subject, but we trust the leaven is at work. At least, there is a hopeful sign in the advertisement of a competition for municipal buildings for the city of Glasgow, which appears in the *Building News*, in which the town authorities promise that the designs shall be submitted to an eminent neutral architect for adjudication. In other respects this competition has its peculiarities. The floor plans, it appears, are already fixed, having been designed by the city architect, and competitors will only have to make elevations. Perspectives are not to be received, and all drawings are to be in line, at a scale of ten feet to the inch. The premiums offered are certainly more than usually liberal; the first is seven hundred and fifty guineas, the second five hundred, and the third three hundred. The cost of the structure is limited to a hundred and fifty thousand pounds, and the designs must be in a "dignified classic" style. Another good point is the length of time allowed for preparing drawings, the advertisement being dated March 9, while the last day for receiving designs is June 15. This would give time for even the Transatlantic geniuses, who think classic design is easy, to try their fortune.

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THE VENTILATION OF BUILDINGS.[1]—I.

This subject is inseparably connected with heating, for two good reasons, viz.:—

First, In all cold climates the fresh air that is introduced must first be artificially warmed in some way.

Second, Heat as a form of mechanical energy is largely used as a motive force, in connection with gravity, to set in motion the air which we wish to move, whether outward from within our buildings or for the introduction of a fresh supply from outside.

There are various sources of impurity in the air of our buildings, more or less prejudicial to health, many of which can be *kept out* and avoided in great measure, and should therefore never be allowed to contaminate the air within the walls.

Among these sources are the following:—

(*a*) Emanations from cast-off clothing of diseased persons, or soiled undergarments awaiting the laundress, even when worn by persons in ordinary health, for such garments always contain effete matter in a somewhat volatile condition.

Shakspeare in the "Merry Wives of Windsor" makes a point of the coarse sensibilities of Falstaff being disgusted by this — in an age much less sensitive than our own.

(*b*) Excreta of all kinds, whether fluid or solid, but particularly those of diseased persons.

(*c*) Dampness in cellars, mouldy heaps of rubbish, leaky pork-barrels, spilt food, and all kinds of vegetables stored in cellars.

(*d*) Cooking fumes of all kinds, for, however savory some may be, others are not only nauseating, but absolutely injurious.

(*e*) Gases from cooking or heating fires, and the products of combustion of illuminating-gas.

(*f*) All descriptions of filth in the soil, whether recent or old.

(*g*) Leaky drains, and accumulations of putrescent matter in cesspools or drain-pipes.

All these and similar sources of bad air must first be eliminated by removing the cause, leaving for ventilation only the duty of removal of the volatile excreta from the lungs and skin of the inmates. Perhaps the removal of cooking fumes and the products of the combustion of illuminants can be treated of as ventilation, but these gases should be specially provided for, and never suffered to diffuse themselves, as is generally done, all over the building. The quantity of the contamination caused by illuminating-gas is enormous, and will be referred to hereafter.

After the elimination of all such foul agents as have just been alluded to, we shall find quite enough left to be done within the prescribed limits without being encumbered with these substances, which I shall therefore suppose to have been excluded from the apartments which are to be treated by ventilation.

The importance of pure air is doubtless a familiar subject to you all. The chemical qualities of its constituent parts, and their effect upon the human system, are now tolerably well known to all who have paid any attention whatever to either chemistry or physiology. But the *standard of purity* is a subject about which a variety of opinion exists among different people. Nature has fortunately endowed us with a faculty of conforming to a certain amount of impurity without visible harm, if the system is sound and strong, though more delicate persons suffer from the lesser quantities.

Thus we see, in various races of men, acquired powers of resistance, which enable them to endure conditions which would be very troublesome to others. The extreme in this direction is attained by the Esquimaux. Dr. Kane, in his description of a night passed in one of their huts, buried in an enormous drift of snow, says he "crawled in on his hands and knees through an extraordinary burrow thirty paces long." He "soon found himself gasping the ammoniacal steam of some fourteen vigorous, amply fed, unwashed, unclothed fellow lodgers. He had come, somewhat exhausted by an eighty miles journey through the atmosphere of the ice-floes. The thermometer inside was +90°, and the vault measured fifteen feet by six. Such an amorphous mass of compounded humanity one could see nowhere else: men, women and children with nothing but their native dirt to cover them, twined and dovetailed together like the worms in a fishing basket," etc. But even the endurance of the Esquimaux is slowly yielding to the grim conditions by which they are surrounded. Their numbers are waning. Nature refuses to go beyond the limit reached in Greenland, in fortifying man against such influences. The children who survive to grow up, do so by reason of their strength, by the stern rule of the "survival of the fittest," but their numbers do not replace those who have gone before them. The race is passing away. In leaving the high latitudes and entering more temperate regions, the taste of man shows his appreciation of a fair allowance of pure air, while his physical development improves by the use of it. Yet the force of habit is strong even with us, — so much so that the reasoning powers and scientific data must be resorted to, in order to save enough pure air in our crowded cities to prevent positive harm. You are all aware of the stifling air of a theatre gallery if you enter it late in the evening from a cool north-west wind in the street. Yet if going in earlier, and taking the increase of impurity as it gradually accumulates, by insensible degrees, it is only noticed by its secondary effects upon the system, — dullness, headache or sleepiness. Thus the standard of purity must be a conventional and arbitrary one, fixed by experience, and adapted to the class of occupants by whom the building is to be used. If the conditions of climate do not favor a free circulation through open windows, and particularly when artificial heating becomes necessary for health and comfort, the problem soon becomes a difficult one, and must be solved independently for each particular case, according to its ruling conditions. The element of cost generally enters into the case as one of these conditions; for where money has to be spent to get pure air, the higher the standard required, the more will be the expense of furnishing the supply.

The vitalizing or valuable element in the air for the support of animal life is well known to be the 21% of oxygen, which is diluted by about 79% by volume of nitrogen, the latter being practically inert. The injurious effects of foul air are two-fold: first, the diminished supply of the oxygen, which is felt in the loss of quality in the blood, and hence a loss of tone throughout the system; and second, the increase of organic impurities, by which the blood becomes yet further deteriorated, or, if still continued, actually poisoned. These are the same effete substances which nature is constantly excreting through the lungs and skin. It was formerly thought that the active injury, effected by breathing air which had been previously breathed, was due to the CO^2 exhaled, and this gas was made a great bugbear in all the earlier treatises on ventilation. But more recent physiologists consider this ingredient as nearly neutral, to the extent of the quantities ordinarily found even in crowded apartments, and impute the harm to organic effluvia which are so various in their nature, and often so subtle, as to defy ordinary chemical tests. But though these harmful agents cannot be so readily counted and weighed in any specimen of the air, it is generally accepted that they exist about in proportion to the *excess* of CO_2 in air that has been breathed. It is known that a certain small amount of CO_2 exists in the purest air, about four parts in 10,000 in volume; also that air exhaled from the lungs contains about a hundred times as much, — say 4%. Now this change is readily detected and measured by simple chemical tests, with sufficient accuracy to enable us to use it as an index of the deterioration of the quality of the air which it has suffered by once being breathed. Dr. Angus Smith gives this test: That no precipitation of carbonate should be given when a 10½-oz. phial full of air is shaken in ½ oz. of clear lime-water. Assuming that this increase of CO_2 is commensurate with both the loss of oxygen and the amount of organic impurities, this excess of CO_2 over the standard quantity of four in 10,000 is therefore generally used as a test of the essential deterioration.

The standard of purity is stated by Dr. Parkes as six parts in 10,000, or 50% more CO_2 than existing in pure air. That is to say, this quantity cannot be exceeded without appreciable injury to persons of delicate organization, and should therefore be taken as a proper limit to be worked to as far as practicable. It may perhaps be considerably exceeded for a time, *i. e.*, 7 or 8 and even 20 parts in 10,000 will not be fatal, but will create certain discomfort and lassitude. An average pair of lungs is said to exhale $\frac{6}{10}$ of a cubic foot per hour of CO_2, while, according to Pettenkoffer, about 15 cubic feet of air are exhaled during the same time. The time required to vitiate a given volume, V, by one pair of lungs, then, to this degree (.0006), is $T = \frac{.0002\ V}{0.6} = \frac{V}{3000}$ in hours, so 3,000 feet will keep a man comfortable only one hour, say a room 10 feet high and 17.3 feet square, if hermetically sealed. If tight rooms were more easily got, we should suffer oftener; all rooms leak gas, by diffusion. CO_2 has a specific gravity of about 1.5, yet is not inclined to accumulate at the bottom of a room. Even though not chemically combined with air, the gas pervades the whole space. Gases of a different specific gravity never stand long in one another's way; they all have a harlequin habit of jumping through one another with great agility, each gas being, as it were, a vacuum to others, though somewhat obstructing their diffusion. This fact of diffusion was announced by Dalton, but its law was defined by Graham: thus, that each one of two gases of different specific gravity, when separated by a porous diaphragm, diffuses itself through the space occupied by the other gas, at a rate varying inversely with the square root of their relative densities. Thus, taking hydrogen and oxygen.

	Sp. Gr.	$\sqrt{\text{Sp. Gr.}}$	Coefficient of Diffusion.
H	1	1	4
O	16	4	1

The fallacy of some men is obvious, who talk about the CO_2 always settling to the bottom of a room, and needing ducts to take it away from thence.

Pettenkoffer relates that when on a visit to Marienbad, he noticed a spring from which a constant delivery of gas took place, consisting chiefly of CO_2. The spring was surrounded by a small wooden building, and walled in by a tank 23.7 metres long by 11.4 metres wide. The water was two metres deep. On one long and one short side of the tank extended a platform, near the level of the water surface, from which you could look down and see the gas bubbling up. He had no means of measuring this flow of gas, but estimated that it must exceed one millimetre depth on surface, per second, equal to six centimetres per minute, or 3.6 metres per hour.

If this gas were not rapidly diffused, the building would soon be filled to a depth of three metres, and in an hour the air would become unbreathable. A man standing on the platform has his head only 250 to 260 centimetres above the water; but no inconvenience arises from standing there for hours together.

[1] A lecture by Mr. Edward Philbrick, C. E., delivered before the students of the Massachusetts Institute of Technology.

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"*Man lebt darin wie in gewöhnlicher Luft.*"

Only beneath the platform are candles extinguished, near the water. Soap-bubbles blown by a man's breath, and allowed to fall towards the water, are checked only by the immediate approach to the water, where they float quietly on the stratum of gas. An approximate analysis of the gas [1] showed it to consist of 70% CO_2; at 5 centimetres above water, 31% CO_2; at 25 centimetres above water, 28% CO_2; at 100 centimetres above water, 2% CO_2; at 145 centimetres above platform, less than $\frac{1}{2}$% CO_2.

So far as we know, the organic vapors which we wish to get rid of are subject to the same law of diffusion. The *vapor of water*, however, is supposed to possess an attraction for organic exhalations, and serves as a vehicle for their diffusion. Hence, and for other reasons, air that is saturated with vapor of water is more commonly complained of as oppressive, and is really more likely to be unwholesome, than dry air, of which I shall have more to say later.

We have considered the case of a man enclosed with, say, 3,000 feet of air, which would in an hour's time reach the proper limit of vitiation. The next question is, how fast to introduce fresh air in this apartment to prevent the increase of such vitiation. As the process is supposed to continue at the same rate, we must evidently supply an entirely new volume every hour, *i. e.*, 3,000 cubic feet, or fifty feet per minute.

Dr. Billings, of the Johns Hopkins Hospital at Baltimore, uses for hospital wards a somewhat larger figure than this, viz., one cubic foot per second per man; a convenient ratio to remember. Of course a still larger quantity is required for certain surgical wards and in cases of contagion; while a smaller quantity must be accepted in many cases where the cost would be unreasonable, or inconvenient draughts would be occasioned by its introduction. From these considerations we see that although the air contains some 21% of oxygen, we can avail ourselves in respiration of only a small part of this without suffering. When the quantity of oxygen is reduced by even $\frac{1}{20}$ of this amount, the air is unfit to breathe, representing essentially the same condition as an increase of 1% of CO_2 with a corresponding increase of watery vapor and organic exhalations.

In order to learn the effect of close air upon the system, within safe limits, Dr. Angus Smith says he constructed a closet, lined with lead, and containing, when a man was in it, 170 cubic feet of air. After remaining in this apartment one hour and forty minutes, the CO_2 had attained to 1%. The first change that his senses noted was that of increased moisture, making the air feel "soft." After one hour he perceived an unpleasant smell of organic matter, like that in a crowded school-room; but made perceptible only when stepping about, and thus accumulating the effect of the successive portions of air coming in contact with his lungs. After one hundred minutes the smell became quite unpleasant, and he came out. Three other persons entered at once, and said it was *very bad;* after one minute he entered again, and found it "extremely bad." The oxygen was reduced to 20%. "Was glad to escape, though not conscious of discomfort. The pleasure on coming out was altogether unexpected; like that experienced on walking home on a fine night after leaving a crowded room." His attention had to be called to the bad odor, however, while in the chamber, in order to perceive it; *i. e.*, it did not arrest attention. It took four hours for his lungs to recover their normal condition, *i. e.*, to work unconsciously, after coming out.

The second time he stayed inside for one hundred and sixty minutes; after the first one hundred and forty minutes, he found a long breath was agreeable; the air felt close. On standing in a chair it seemed worse. The oxygen was then reduced to 19.61%.

He afterwards reduced the oxygen by burning candles in the room, and entered the closet with candles and a spirit-lamp. The candle was soon extinguished; he tried to light it, but the match would not ignite. He still breathed without difficulty; but gradually a feeling of discomfort came on, hard to describe. The breathing increased in rapidity. He afterwards lighted the gas, which burned brilliantly. After the gas had gone out, he went in again, and stood up in a chair, but felt incipient faintness; yet the senses were not so unpleasantly affected by the smell, etc., as in a crowded school-room. His lungs seemed to refuse to expand; but he could not tell why.

After opening the door the oxygen was tested and found 17.45%. He was satisfied from these experiments that badly ventilated rooms that contain less than 20.7% oxygen are very unwholesome. Even if a man lives where a candle will not burn, he does not think it proved that he is not injured.

The closet was tried voluntarily by a young woman, after the oxygen had been reduced to less than 19% by candles, and the CO_2 had reached 2.1%, but no organic matter from human breath. She stood for five minutes very well, then suddenly became white, and could not come out without help.

Again, having supplied CO_2 artificially in the closet to 3.84%, and reduced the oxygen to 20.19%, two men went in, and got headaches instantly. They were not able to stay over seven or eight minutes.

The same lead closet was used as a test of the amount of heat given off by a man in a given time; but as it was not surrounded by a good non-conducting medium, it is probable that considerable heat was wasted through the walls. One man, confined for one hour, was found, on a mean of five tests, to heat the 170 cubic feet of air 5.64° Fahrenheit.

Dr. Smith goes on to say that in the earlier stages of want of ventilation the organic exhalations are most injurious. These bad influences increase with the temperature, but those of CO_2 do not. So that we ventilate in warm weather more for getting rid of the organic matter than the CO_2. The increase of the vitiation to an injurious degree is so insidious, and makes so little impression on the senses, that he considers lack of ventilation worse than the fumes of vitriol: those would alarm the sense of smell, and notify us at once of their presence.

The relative quantities of oxygen and CO_2 in air, under different conditions and in different places, is given in the following table: —

TABLE "A."

VOLUME OF CO_2 IN THE AIR. [From Dr. R. Angus Smith.]		VOLUME OF OXYGEN IN THE AIR. [From Dr. R. Angus Smith.]		
Places.	Percentages.	Places.		Percentages.
Near Chambeisy,	.0460	London, North,	7 tests	20.857
Lake Geneva,	.0439	" South and S.W.	16 "	20.883
Suburbs Manchester (14 tests),	.0369	" Parks,	7 "	20.95
Pit of theatre,	.2734	" Metropolitan Railway tun'l	10 A. M.	20.60
Stables,	.0833	" "	7.30 P. M.	20.79
Study, at table,	.1177	Manchester, wet day,		20.98
" at ceiling,	.1561	" dry day,		20.91
School-room,	.0970	" dense fog,		20.82
" "	.0886	" suburbs,		20.96
In brewery,	.1214	" sitting-room,		20.89
" near vats,	.1800	Theatre pit,	11.30 P. M.	20.74
In a mill, with 400 people,	.2830 to .3000	Theatre gallery,	10.30 P. M.	20.63
Streets of Manchester, fair,	.0403	Scotch Mts., mean	24 places	20.96
" " fogs,	.0679	" lower, "	12 places	20.94
" " near privy,	.0774	Scotland, mean of	30 places	20.96
" " in suburbs,	.0291	Sea-shore on Heath,		20.999
" " in close blds.,	.1604	Manchester, front y'd,		20.943
		" near privy,		20.700

The higher the apartment is made, and the more cubic space per head, the easier it becomes to regulate the change of air without sensible draughts. It is found that if currents are established near the floor at the rate of over two feet per second, a perceptible and disagreeable effect is produced, particularly if the dew-point is low. The inlet ducts must therefore be so adjusted as to position and size as to have this limit observed as nearly as may be in practice.

A great deal of annoyance has been met with by the neglect of this precaution.

Supposing the inlet and outlet ducts to have been provided of sufficient size to change the air at the desired rate, we have still to see that the fresh-air inlets are so disposed that the air will be properly *mixed* with the air already in the room, and not pass directly to the outlets, as is too often the case. Such a result would of course leave the air in the room without the needed renewal, and it would fall below the desired standard in quality. Even after arranging all the apparatus with the greatest care, it will be found to work very irregularly under differing conditions as to wind and weather. Strong winds on the exterior of a building always exert a powerful influence upon the movements of air in the interior, both by their action through the ventilation ducts, and through all the smaller orifices about doors and windows, and the pores of the walls themselves. Their sum total is often capable of admitting a large quantity of air in windy weather, or when large differences of temperature exist between outside and inside. These cracks do a great deal of work under such circumstances, when least wanted; but in sultry weather, when ventilation is often most needed, they are quite inactive, and cannot be relied upon. Their action is therefore not to be regarded as an assistance, but rather as a disturbing element in carrying out any system of ventilation, often requiring a good deal of special attention to counteract or modify their action, and sometimes making all the difference between success and failure.

Diffusion through differences of temperature causes a good deal of change of air in buildings — called thermo-diffusion.

When air or other gas is divided by a porous diaphragm, and warmed on one side to a temperature above that on the other side, diffusion takes place from the cold side to the warm, though the pressures are equal. Pettenkoffer of Munich (as quoted by Hartley) relates this interesting experiment. He had a room in his house with a tight German stove, of fire-brick. The capacity of the room was 265 cubic feet. The doors and windows being all closed, the temperature outside being 32°, and inside 66°, difference 34° Fahrenheit, he found the air was changed completely every hour. After putting a fire in the stove, the change of air arose to 3,320 cubic feet per hour. After pasting paper over all the cracks around doors and windows, the change was at the rate of 1,060 cubic feet per hour, through the walls. When the temperatures were 71° and 64°, difference 7°, the rate of change was reduced to 780 cubic feet per hour.

Mürker and Schulze state (Hartley) that with a difference of 40° of temperature air goes through one square yard of wall of different materials thus: —

	Cubic ft. per hour.		Cubic ft. per hour.
Sandstone	4.7	Tufaceous limestone	10.1
Quarried limestone	6.5	Mud	15.4
Brick	7.9		

[1] See *Zeitschrft für Biologie*, vol. ix., p. 246.

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This is a very important fact in regard to dwelling-houses, where the number of persons is often small in proportion to the area of outside wall, but paint on walls may modify this largely.

Let us now consider the influence of the common methods of illumination upon the character of the air.

TABLE FROM LUNGE IN DR. LINCOLN.

Kind of Light.	Used per hour. Litres.	Candle power.	CO_2 per hour. Litres.
Petroleum	0.045	10.	56.8
Oil lamp	0.025	4.	31.2
Candle		1.	11.3
Gas (flat burner)	127.	10.	86.
One man			17. = 0.6 cubic ft.

For equal light we get (*Roth and Lex, Dr. Lincoln*): —

	C O_2 in litres per hour.
Street-gas	155.
Refined oil	87.
Petroleum	75.

Street-gas evolves 681 volumes CO_2 for every 1,000 feet of gas. (*Lunge in Dr. Lincoln.*) Hartley says, two of CO_2 to one of burning gas.

Thus we see that an ordinary flat burner, consuming 127 litres or about four cubic feet per hour of street-gas, consumes as much oxygen and delivers as much CO_2 as *five* men, while an argand burner, very commonly used on our parlor tables, is equivalent to at least eight men. It may be said that the burning of gas does not evolve the organic impurities that human lungs do. But unfortunately street-gas has its own impurities, which though not organic are possibly quite as noxious, viz., sulphur, which in burning in free air produces SO_2, which is often betrayed by the tarnishing of silver-plated surfaces exposed in the room where much gas is burned. At any rate, the depletion of oxygen is a positive loss, however pure the gas may be.

If due consideration were given to these facts in planning the gas-lights, we should soon find that the easiest way to deal with the products of the gas-burners would be to provide special ducts to take them out of the rooms, whenever they are used in any considerable numbers, as they generally are in theatres, halls, etc., as well as in strongly illuminated parlors. Fortunately the amount of heat evolved by the burning of gas is generally sufficient to serve as a motor to expel the noxious products from the room, if we only provide suitable ducts for this purpose. The pure air will readily take the place of what is thus gotten rid of, if we give it a chance; for gravity assists, that is, the bad gases are so heated that their buoyancy helps them out of our way, while the considerable quantity of vapor of water which is evolved by the combustion of the hydrogen serves as a vehicle to take up and carry along the SO_2 and other impurities which the burning gas gives out.[1]

PORTLAND CEMENT.[2] — II.

HAVING considered what I have called the problematical tests of cement, namely, its weight, fineness, and specific gravity, and shown the results which may be expected by this preliminary examination, there remain to consider the absolute test of tensile strength, and the manner in which it is carried out. The object of the test for tensile strength is to obtain the best possible results under certain conditions. The conditions are generally those already given in the extract from the regulations of the Metropolitan Board of Works.

It is evident that to obtain the best result much must depend on the manipulation of the cement, the manner in which it is gauged, the amount of water which is used for the purpose, the care with which it is placed into and removed from the moulds, the length of time which is allowed to elapse after gauging before it is placed in the water, the form of the mould used, and many other minutiæ of manipulation which can only be acquired by actual experience and practice. The amount of water which is required to reduce a cement to a proper consistency, or, technically, to properly gauge it, varies from fifteen to twenty per cent. A quick-setting cement generally requires a larger percentage of water than a slow-setting one, but the exact amount required can only be determined by actual experiments with the sample under examination. The amount of water required also depends upon the skill of the manipulator, as an experienced gauger will bring the mass to a proper consistency with less water than another of less experience or skill, and, as the amount of water used materially affects the result obtained, the importance of using a minimum cannot be over-estimated. Many of the discrepancies which arise when testing cement are undoubtedly due to this cause. With the object of overcoming this difficulty I have devised a small machine for gauging cement, and I find that by its use less water is required, and that the operation of gauging is done much quicker, both points which materially affect to its advantage the result obtained.

The custom seems to have become general that the briquettes should be placed in water twenty-four hours after gauging; this time, though it is perhaps convenient to gauge up on one day and place the briquette in water on the next, — and gives a slow-setting cement every chance, — still, it certainly does not act beneficially on a fairly quick-setting cement, and it is generally advisable to place the briquette in water as soon as it is possible to remove it from the mould without fear of damage, and the twenty-four hours may be taken as the limit of time; as, though a cement which has not by then set sufficiently to bear removal from the moulds may be a fairly good cement, it is too slow in setting to be of much practical value. Again, with regard to the area of breaking section of the briquette, it is usual to specify that the cement shall carry so much on the square inch, and yet the briquette generally in use has a breaking section of 1.5 inches square, giving an area of 2.25 inches. How this custom has arisen, I am unable to say, but it would undoubtedly greatly assist in clearing up many of the discrepancies now to be met with if one uniform section and form of briquette were adopted, and inasmuch as the strength on the square inch is specified, it would seem natural that the briquettes should have that area of breaking section. It will be readily understood that the form of the briquette has much to do with the result obtained, and it is essential that the strain put on the briquette should be tensile only, all crushing forces being detrimental and often resulting in the fracture occurring elsewhere than at the smallest part, and hence giving a false result. Also that the briquette should be capable of easy removal from the mould in which it is gauged — avoiding all necessity of knocking the mould in order to remove it, as such is liable to injure the set of the cement. After experiments with many different forms of briquettes, I have adopted the form shown on diagram No. 2, as the one which best meets most requirements, and which certainly gives the best results of any I have yet tried.

There is another matter which seems to have been overlooked, or at all events not estimated at its full value, by experimentors with cement, namely, the increase in strength between a briquette broken at the expiration of seven days and at the expiration of twenty-eight days. Many cements will stand the ordinary test at seven days, and yet be utterly worthless at twenty-eight days; others will give a good result at seven days, and improve but little afterward; while a cement that gives a comparatively low result at the expiration of seven days may at the expiration of twenty-eight have considerably increased in value. The result of the subjoined experiments shows that this is a most important matter in estimating the ultimate strength of a cement.

No. 2

By an examination of Table IV., it will be seen that No. 1 was a cement that actually satisfied all requirements at the expiration of seven days, and yet at twenty-eight days was actually worthless, being much blown and consequently having no strength whatever; and it would undoubtedly have pulled to pieces any work in which it was used. Nos. 2 and 6 were both strong, quick-setting cements, and showed good results at the expiration of seven days; in fact, they seem in that short time to have attained almost their ultimate strength, as their increase during the next three weeks was but two and five per cent. The other samples show results varying from 20 to 40 per cent increase in tensile strength between the seven and twenty-eight days, and it will be

TABLE No. IV.

No.	Tensile strength, section 1" square. 7 days.	28 days.	3 months.	Increase or decrease per cent at 28 days.	Increase or decrease per cent at 3 months.
	lbs.	lbs.	lbs.		
1	380	210	—	— 44.73	
2	701	718	728	+ 2.42	+ 3.85
3	510	647	716	+ 26.86	+ 40.39
4	605	772	826	+ 27.60	+ 36.52
5	476	662	—	+ 39.07	
6	693	728	—	+ 5.05	
7	589	764	901	+ 29.88	+ 52.97
8	666	810	—	+ 21.62	

[1] The quantity of *heat* evolved by the combustion of a cubic foot of ordinary illuminating gas is estimated at 700 heat units: an ordinary four-feet burner would then evolve $4 \times 700 = 2800$ H. U. per hour, or 46.6 per minute. The specific heat of air is 0.238, nearly. A cubic foot of air at 60° weighs $\frac{536}{7000} = .0766$ lbs. So that to ascertain how many cubic feet of air, at 60°, would be heated 1° by burning a four-foot burner one minute, we have $\frac{46.6}{.0766 \times 0.238} = 25.562$, or 2,556 cubic feet, 10°, nearly. When we consider that air increases in volume $\frac{1}{490}$ for every 1° of temperature, we see here plenty of motive power to carry off the heated air, and a disturbing element for heat of room if not carried off.

[2] A paper by Mr. Henry Faija, Associate M. Inst. C. E., read before the Royal Institute of British Architects, February 23, 1880.

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seen that at longer dates the quick-setting cements are by no means the strongest.

The importance of fine grinding is again exemplified by examples Nos. 6 and 8. No. 6 is the cement as received from the works: 33 per cent of it would not pass through the No. 50 sieve. No. 8 is the same cement, but ground so fine that it would all pass the same meshed sieve. While, in the cement as delivered, the increase in strength between the seven and twenty-eight days was but five per cent — when ground it amounted to 21 per cent.

By examining Table V., the great loss in strength by using too much water for gauging the cement, and the consequent advantage of using the minimum quantity by which the mass can be rendered plastic, are apparent.[1]

TABLE No. V.

	Percentage of water used.	Tensile strength at 7 days.
		lbs.
No. 1	15.2	520
" 2	15.8	445
" 3	17.8	346

In this paper I have treated solely of what may be considered good cements, and have given the result of the tests made with them under different conditions. The failure of a cement by expansion or contraction during the process of setting has not been brought under consideration, but it is needless to say that a cement which does either would be a dangerous cement to use, the only exception being that a good cement will sometimes blow if used too soon after it has left the mill and before it has had time to cool; but such a cement would, after being properly warehoused, be perfectly reliable.

The deductions which I have endeavored to prove from experiments are: —

1. That the weight per striked bushel, unless taken in conjunction with the fineness to which the cement is ground, is absolutely valueless as a guide to the quality of a cement, and that therefore the two should always be taken in combination, and that it is also advisable when possible to take the specific gravity.

2. That the finer a cement is ground, the less it will weigh per striked bushel, but that it will at the same time be stronger.

3. That the core or coarse particles in a cement act deleteriously, and can be compared only to so much sand.

4. That to be able to form a true opinion of the value of cement, briquettes should, when practicable, be tested at twenty-eight days, as well as at seven, and that the greater the increase per cent is between those dates, the stronger and harder is the cement likely to become.

The details of the weight and fineness, and other matters deduced from the foregoing tests, I have embodied somewhat in the form of a specification which I think meets most requirements, but the purposes for which a cement is to be used must of necessity govern many clauses. Thus: —

SPECIFICATION.

Sample. — From each delivery of cement on to the works a sample of about one bushel will be taken indiscriminately from at least twelve sacks or casks, as the case may be, and will be subjected to the following tests, with the whole of which it will have to comply. The sample thus taken will be considered to indicate the quality of the entire delivery.

Fineness. — The cement to be so finely ground that it will all pass without leaving any residue when sifted through a copper-wire sieve having 625 holes to the square inch, and when sifted through a similar sieve having 2,500 holes to the square inch, the residue, or that which is unable to pass through, shall not be more than 15 per cent of the bulk before sifting.

Weight. — The weight per striked bushel to be not more than 116 pounds nor less than 108 pounds, but the weight must in all cases depend upon the fineness: thus, according to requirements, a cement which, when sifted through a sieve having 2,500 holes to the square inch, leaves a residue of from 12 to 15 per cent, must weigh not less than 112 pounds per striked bushel; should the residue be from 8 to 12 per cent, the minimum weight to be 110 pounds; and should there be less than 8 per cent residue, the minimum weight to be 108 pounds per striked bushel. The bushel measure to be placed on a level floor where there is no vibration, and in every case filled from a zinc or other smooth-surfaced shoot, placed at an angle of 55 degrees, the lower end of the shoot to be five inches above the top edge of the measure. The cement to be allowed to run continuously along the shoot until the cement in the measure is well piled up, when it is to be struck level with a straight-edge. In no case is the measure to be in any way touched or shaken until it has been struck.

Specific Gravity. — The specific gravity to be not less than 2.95, nor more than 3.1.

Tensile Strength. — Twenty briquettes to be gauged from each sample, ten to be broken at the expiration of seven days from the date of gauging, and ten at the expiration of twenty-eight days from the date of gauging. Those broken at seven days to carry an average weight of 400 pounds per square inch of section without fracture, and those broken at twenty-eight days to show an increase in strength of 25 per cent over those broken at seven days. The following particulars are to be observed in gauging the cement to form the briquettes: —

The contractor to use any form or section of mould he chooses in which to make the briquettes, provided always that the breaking sectional area of the briquettes be not less than one square inch. The moulds in which the briquettes are made to be placed on glass or other non-porous beds. The amount of water used for gauging the cement not to be more than 19 per cent of the whole. The briquettes to be removed from the moulds and placed in water within twelve hours from the time of gauging, and allowed to remain therein until they are due for breaking (which will in every case be reckoned from the time of gauging, and not of placing in water), and to be broken immediately on being taken out of the water.

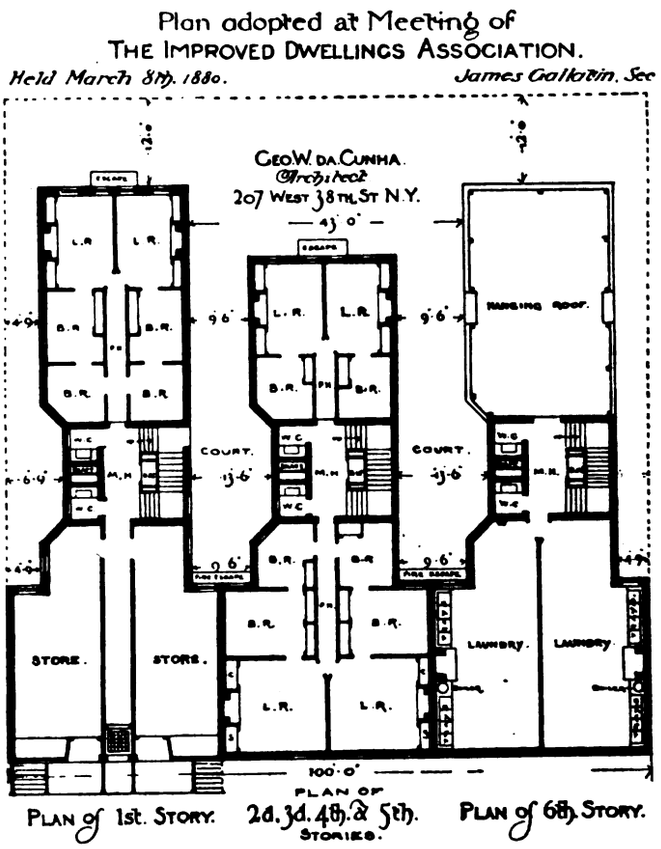
Expansion or Contraction. — Pats about three or four inches square and about half an inch in thickness (gauged with the same percentage of water as is used in forming the briquettes), placed on pieces of glass, to be immersed in water within four hours from gauging, and to show neither cracks on the edges nor on the surface, nor deviation in form when examined at the expiration of seven days.

[1] The results of the tensile strength given, throughout the paper, are in each case the average of either five or ten briquettes, and the percentage of water used is in every case taken by weight.

THE ILLUSTRATIONS.

MODEL TENEMENT-HOUSE. MR. J. W. DA CUNHA, ARCHITECT, NEW YORK CITY.

The Trustees of the Improved Dwelling Association are to build six houses on Seventy-first and Seventy-second Streets, in accordance with the annexed plans.



The houses are to be five and six stories in height, with a half-story to be used for laundry purposes. Two cross walls divide each house into three compartments, insuring security against fire. The apartments are so arranged that they can be rented in suites of two, three, four, and six rooms. Each two families have an entrance from their apartments into a main hall, over which they have sole control. The apartments will have every convenience, wardrobes, dumb-waiters, water-closets, gas and water. Every room has at least one window opening to the air and light. All water-closets have independent ventilating shafts. These shafts have no openings into court, halls, or rooms, and are so constructed that they induce a downward and upward current without artificial means.

DESIGN FOR A COUNTRY HOUSE. MR. A. WALLACE BROWN, ARCHITECT, NEWARK, N. J.

DINING-ROOM INTERIOR. MR. BRUCE PRICE, ARCHITECT, NEW YORK, N. Y.

The fire-place in this dining-room was shown in our issue for last week.

THE UNITED STATES COURT-HOUSE AND POST-OFFICE, TOPEKA, KANSAS. MR. J. G. HILL, SUPERVISING ARCHITECT OF THE TREASURY DEPARTMENT.

STORE ON WOODWARD AVENUE, DETROIT, MICH. MR. JULIUS HESS, ARCHITECT, DETROIT, MICH.

This building was completed at a cost of $20,000. It is intended

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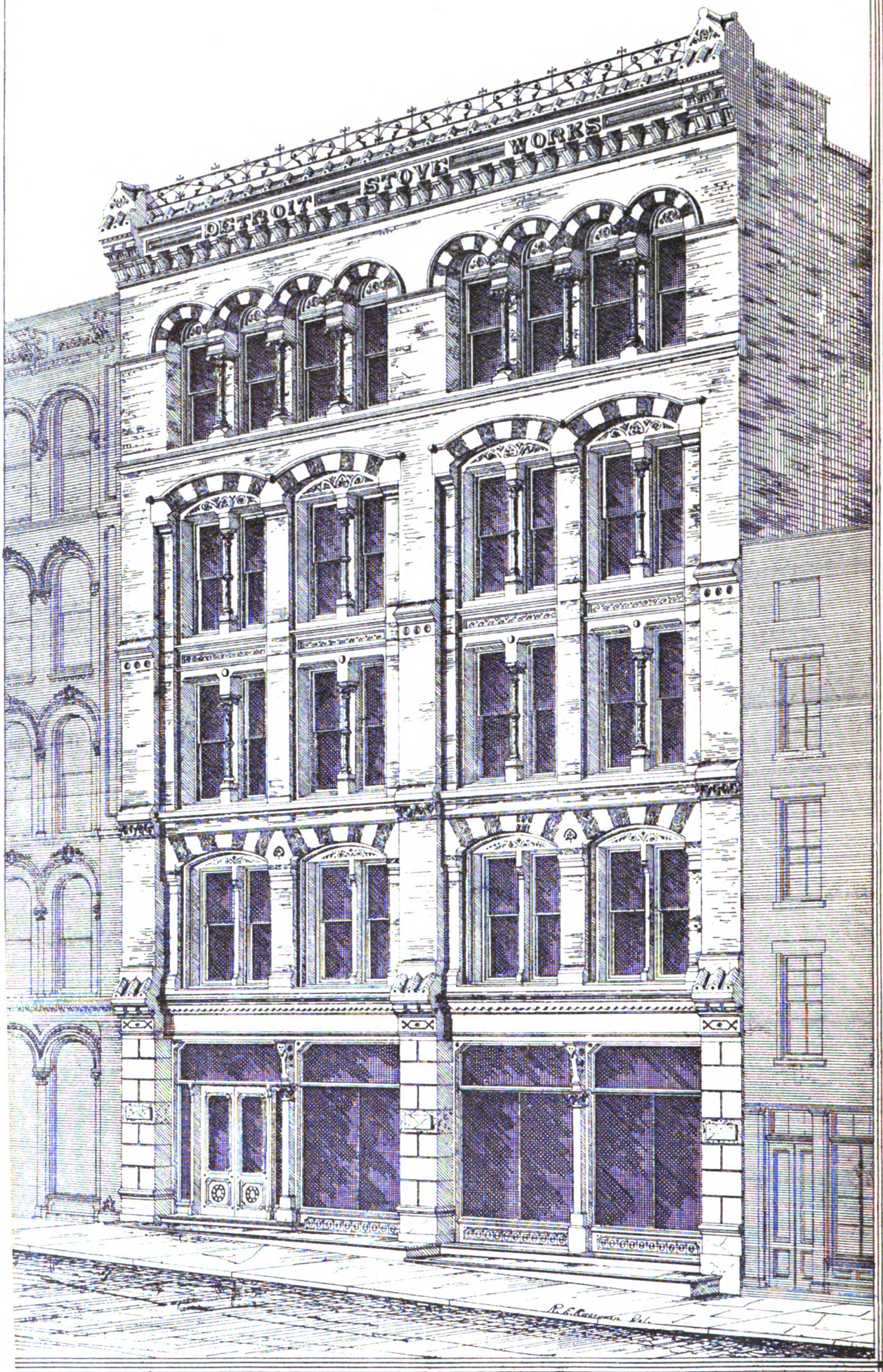
STORE ON WOODWARD AVE FOR DETROIT STOVE CO. — JULIUS HESS - ARCHITECT.



THE HELIOTYPE PRINTING CO. 128 PEARL ST. BOSTON

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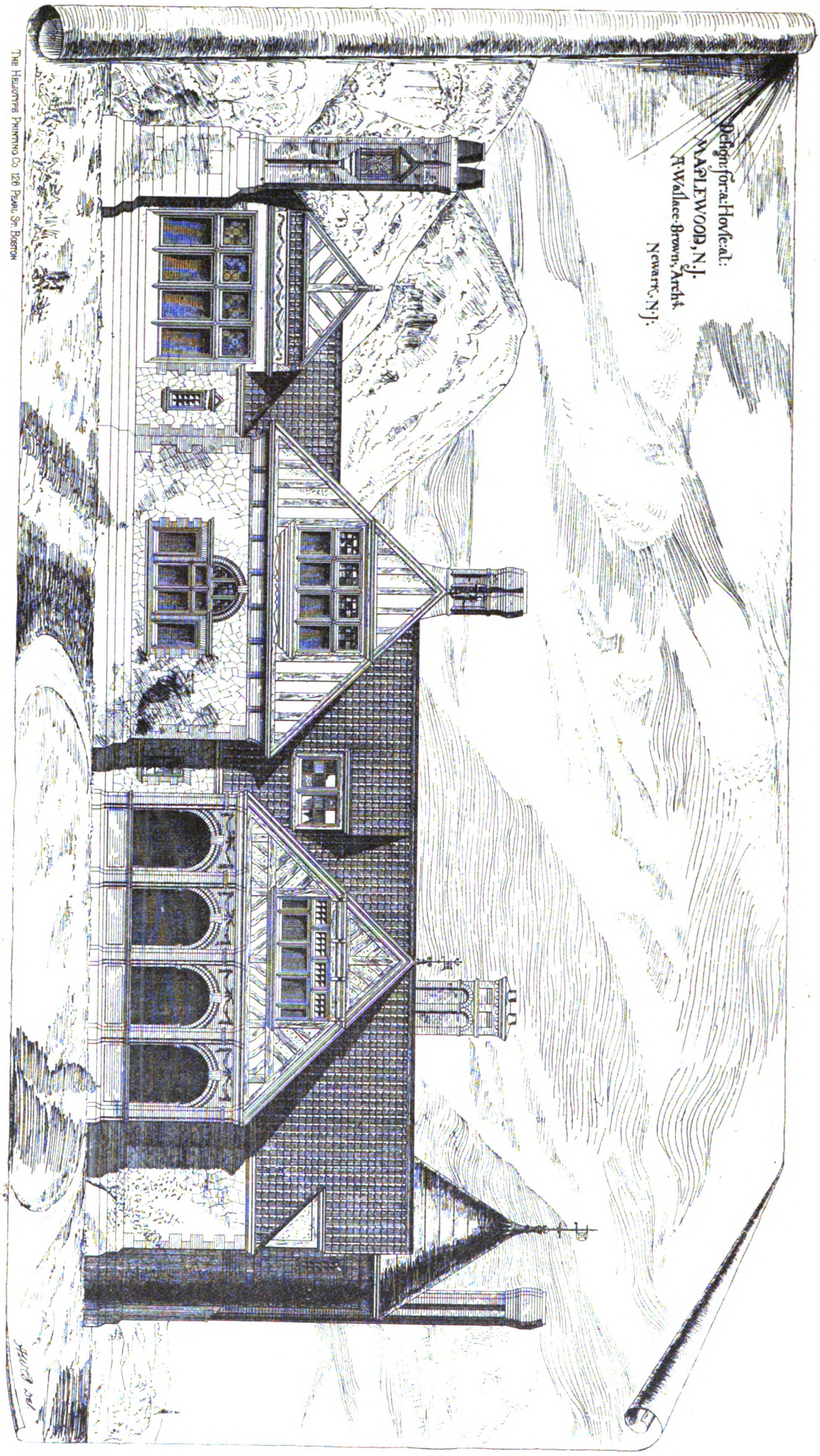

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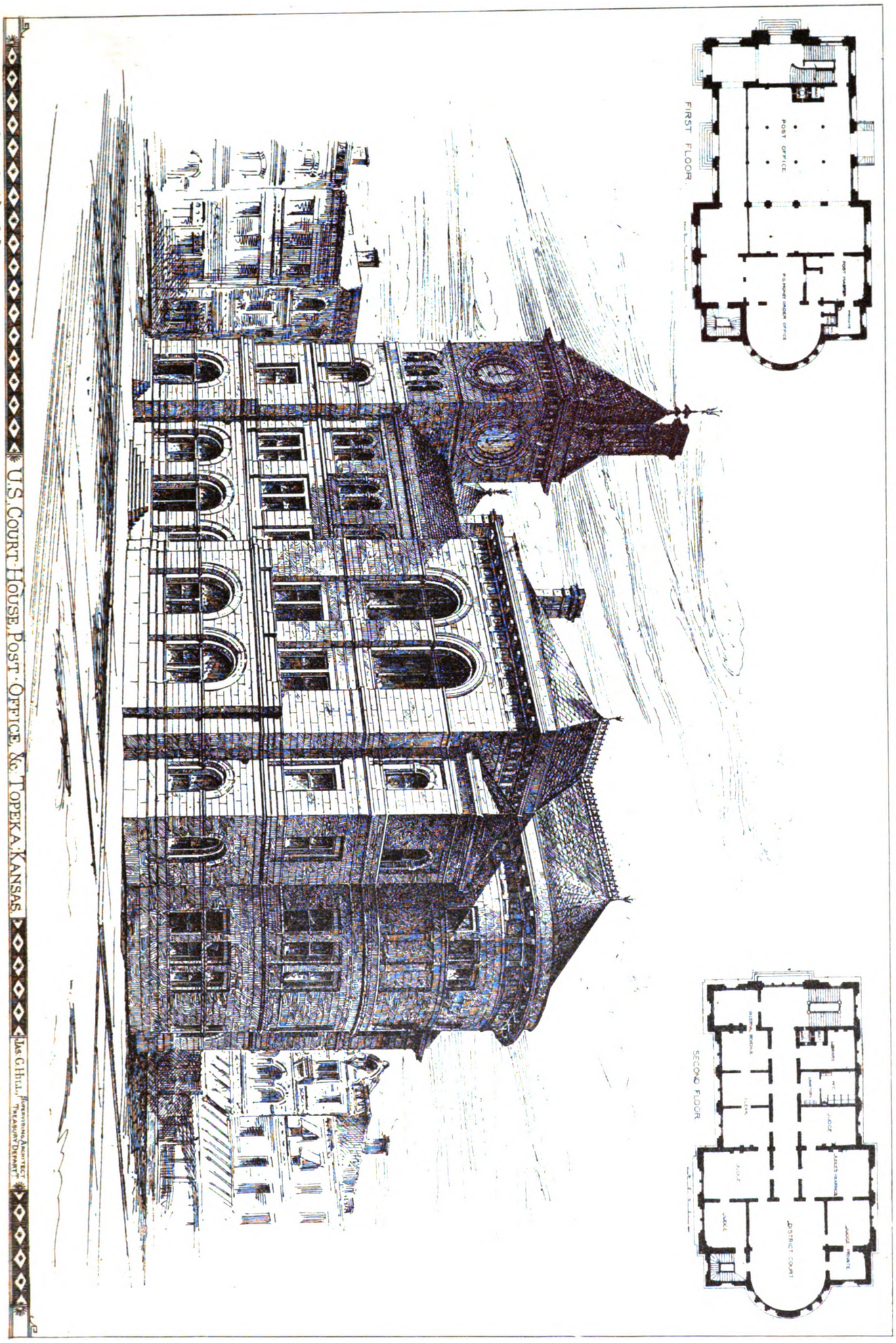

U.S. COURT-HOUSE, POST-OFFICE, &c. TOPEKA, KANSAS.

JAS. G. HILL, SUPERINTENDING ARCHITECT, TREASURY DEPARTMENT.

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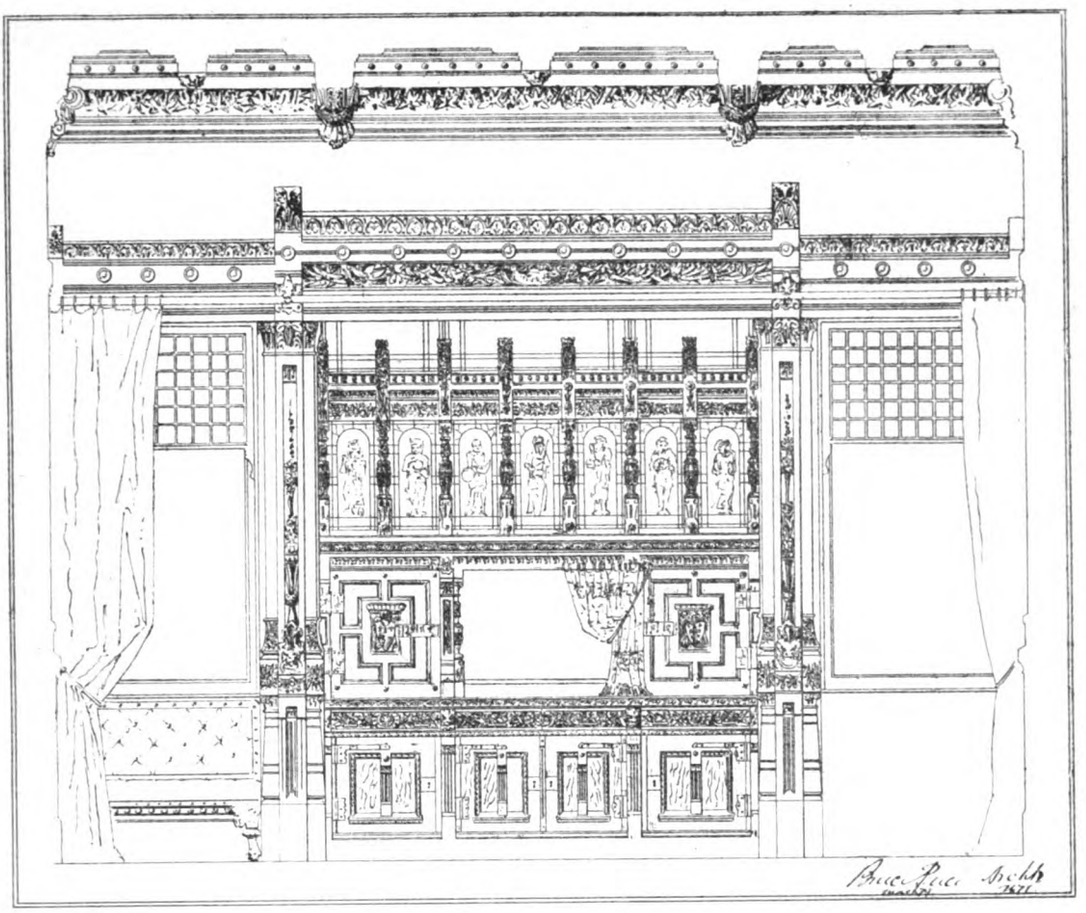

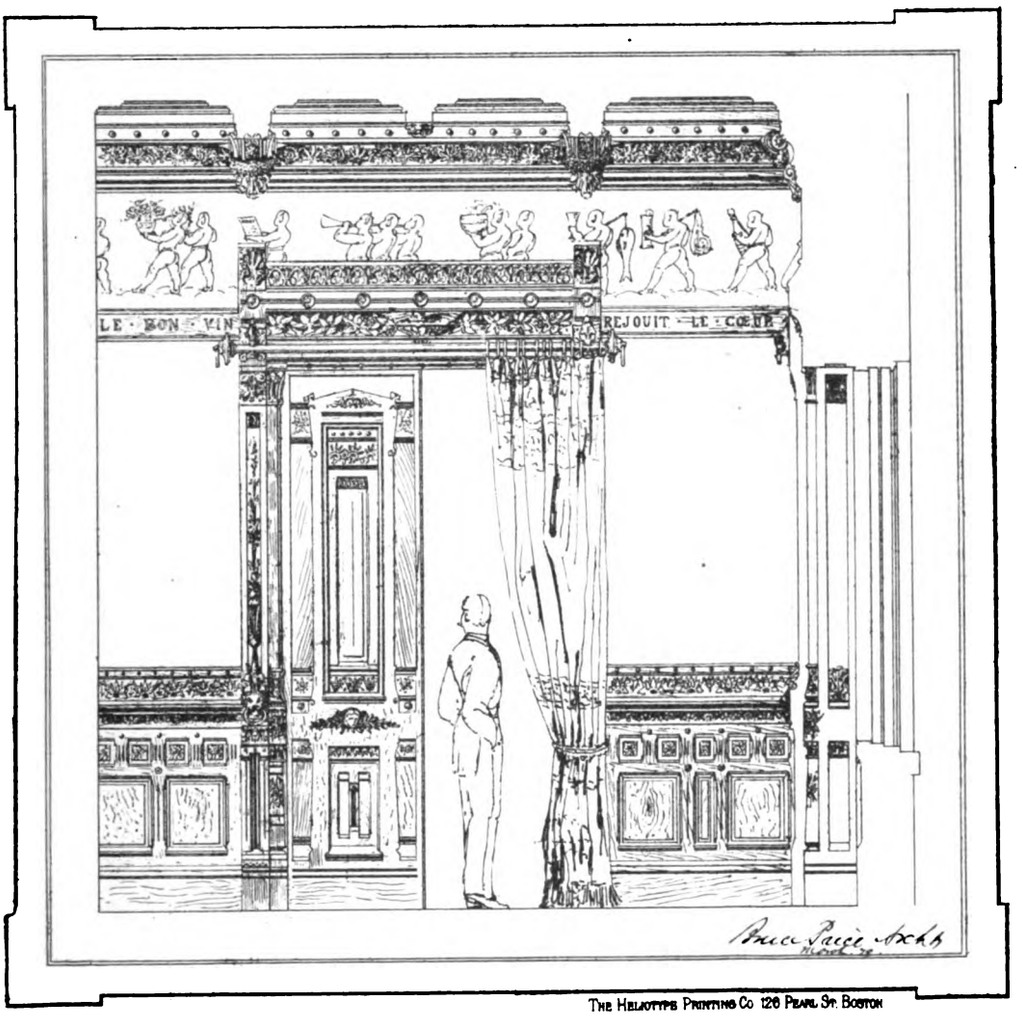

THE HELIOTYPE PRINTING CO. 128 PEARL ST. BOSTON

A DINING ROOM INTERIOR.

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for show-rooms and offices for the Detroit Stove Company. The materials used are red brick with Ohio sandstone finish. Shafts of columns, blue polished granite. The offices are finished in butternut and walnut. The building has a frontage of 50 feet on Woodward Avenue, and a depth of 102 feet extending to an alley at the rear.

THE PERMEABILITY OF BUILDING-MATERIALS.[2]

As a general rule, then, the exhaust openings should be near the floor for buildings heated as is customary at the present day. As an exception to this rule may be mentioned the case of bed-rooms, in which the fresh-air supply is obtained in winter through the open window, and no warm air is introduced. In this case, the air may enter at a temperature at or near the freezing point. The purest air will then be at the bottom. The breath and exhalations from the skin will rise to the ceiling, and an exhaust register there placed will be serviceable. It is well, however, even in such rooms, to have an exhaust opening below, as well as above, for use where it is found desirable to warm the pure air before its introduction, as in cases of sickness or during the day-time when window ventilation would prove inconvenient.

The exhaust openings would also be in place at the top of the room, were the system adopted of supplying air partially warmed, say, at 10° or 15° C. (50° or 60° F.), to rooms heated to a higher temperature by hot pipes or flues behind or beneath the walls and floors. The pure air would then constantly fall below the respired air, and the movement of the strata would be the reverse of that now obtained. Such a system of heating would be the most agreeable and salubrious possible; but heretofore its costliness has stood in the way of its general introduction. The cost being equal, that system which approaches es most nearly the desideratum mentioned must be accounted best.

Under pressure, however slight, such as that of the hot air of a furnace flue of little height, air will escape at a thousand minute openings in a room having a number of doors and windows, however carefully the wood-work be fitted, even if no exhaust flue be provided. The aggregate of all these small openings will furnish an outlet if an ample *supply* be provided under pressure, and where the walls are porous the pores themselves will form an outlet. On the other hand, these same minute openings will, *under slight pressure* inwards, such as is occasioned by burning a fire in an ordinary open fire-place where no fresh-air supply flues are provided, admit the outer air in quantities larger than is generally supposed. Mr. L. W. Leeds in his excellent book on ventilation well says: "In the good old days of open wood fires, when, as in our childhood, the real chimney-corner was the family sitting-room, so to speak, or at least for the children, then, with all the listing of doors, calking of windows, and filling up of key-holes, there was certain to be an abundance of fresh air that would force its way into the room in spite of all efforts to keep it out. But with the introduction of anthracite coal and air-tight stoves, and still worse, steam-pipes, placed in the room for heating by direct radiation, the stopping of all draughts, that were before so annoying, became a matter of easy accomplishment. The results thereof have been perfectly frightful: persons have thus unconsciously been smothered to death by the thousands and tens of thousands."

In order to test the influence of a slight pressure in forcing air through the pores and accidental fissures of an ordinary living room, the writer made the following experiment: A room about five meters square and 3.50 meters high, containing five windows on three sides, two doors and a fire-place, with walls and ceilings plastered and floors of soft pine, was taken for experiment, in a city corner house, now being built by the writer. A flue ten meters long, from a basement furnace, furnished the room with hot air. The windows and doors were first made as tight as possible with rubber mouldings. The fire-place was then closed by drawing the damper and pasting paper over the cracks. The brick back and jambs were oiled to render them impervious. All the wood-work was thoroughly oiled and shellacked. A good fire was lighted in the furnace, and the register opened into the room, all doors and windows being closed and locked, and the key-holes stopped up. The hot air entered almost as rapidly with the doors closed as when they stood open, and it continued to enter at the rate of 2.5 cubic meters per minute without diminution as long as the experiment was continued. The thermometer stood at 2° C. outside. The entering hot air ranged from 40° to 55° C. The day was March 3, 1880. Other experiments gave the same results. The pressure of the hot air from the register was sufficient only to raise a single piece of cardboard from the register. A portion of the air must have passed through the pores of the materials, and the rest through cracks and fissures which escaped detection. On the 5th of March, a coat of oil paint was applied to the walls and ceilings. This diminished the escape of air only about five per cent. On the 19th of March, four coats of oil paint had been put on the walls and ceilings, and three coats on the floor, to render them absolutely impervious to air.

The escape of air was diminished only about ten per cent.

On the 25th of March, all the window-sashes were carefully examined, and all visible cracks at the joints, at the pulleys, cord-fastenings, etc., carefully calked and puttied, and the entire room examined, and putty used freely wherever even a suspicion of a crack could be found. The result of all this was a diminution, at the utmost of but twenty per cent in the escape of the air, or, in other words, in the entrance of air through the register. Each experiment was continued during more than an hour. The air entered as freely at the end as at the beginning of the hour, when a volume of air, more than equal to the entire capacity of the room, had entered it through the register, with no visible outlet.

Nevertheless, numerous microscopic outlets must have remained, especially around the window-sashes, through which the air escaped in this large quantity under the slight pressure applied. In order to render the room completely air-tight, therefore, it would be necessary to surround the windows, doors, mantel, and base-board entirely with a thick coating of some absolutely impermeable substance like tar or putty, or to paste over them large sheets of oil-cloth or paper. The room would then, and then only, be hermetically sealed, and the hot air from the furnace would cease to enter as soon as it reached its limit of compressibility under the pressure applied.

[2] This paper, by the writer of the "Open Fire-place" articles, will be published with them in their separate form.

THE LADY'S BRIDGE, TOLEDO, SPAIN.

A LEGEND.

"THE archbishop has determined to rebuild the bridge."

"The news is too good to be true."

"It is true, for I am the messenger to the architect to whom the work is to be committed."

"Toledo will pray forever for Don Pedro Tenorio if he carries out this design."

Such was a fragment of conversation in the streets of Toledo, in the year 1390. The ancient bridge, broken down by the floods of 1203, and afterwards rebuilt, was now to be restored with great magnificence. The architect was one whose fame had extended far and wide, but this promised to be the crowning achievement of his art.

"Spare not," said the archbishop, "but let the bridge be worthy of the town, of its artist, and of its founder. Let it typify my munificence, thy genius, and the strength and beauty of the city."

"It shall be worthy of all three," proudly responded the artist.

Troops of workmen were now engaged, piles were driven, immense stones, selected with great care, were brought to the river banks, and wrought into shape. The architect spent much of his time in watching the gradual realization in concrete form of his design. At first he was blithe and cheerful, animating the men with his own spirit, and full of devices for smoothing away all the many difficulties that arise to impede such undertakings; but after a while his manner changed, and in proportion as the bridge advanced to completion, he became sad and moody. One day he sat and gazed for hours at the bridge, wrapped in sorrowful thought, taking no heed of the bystanders, like one in an evil dream. A soft hand was placed on his shoulder, a low, shy voice gave utterance to his name.

"Luis!"

"Juanita!"

It was the girl to whom he was betrothed, and whose fate was to be linked to his own on the completion of the bridge.

"Why are you so sad, Luis? What is the meaning of the sorrow that seems to darken all your life? Am I the cause? Do you no longer love me?"

"I love you dearer than life."

She gave a little sigh of pleasure and relief.

"I was afraid some stately dame had stolen your heart away from poor Juanita."

"Impossible. I have no heart. It is in your keeping."

"That's a pretty compliment, but it is not true; for if I had your heart I could read in it the secret cause which has converted my gay lover into a melancholy, moody man."

"I will tell you the cause, Juanita, and my confidence will show you how much I love you, for it places my life and my honor in your hands. Both, alas! will soon be blasted."

"Oh, say not so, Luis. I know you are incapable of crime, and every thing else can be remedied."

"Find me then a remedy for this. In the plans for the construction of the bridge I have made a fatal oversight. The mistake is known only to myself, and I only became conscious of it after all possibility of correcting it was gone. The bridge now is incased in a network of scaffolding, shoring, and supports of every kind; but the moment these are cleared away the centre of the structure will fall into the river, and that which was to have been the monument of my skill will be a hideous ruin, a fit symbol of my folly and disgrace."

Juanita was stunned by this unexpected revelation. The vague fear inspired by her lover's changed demeanor had determined her question, but she had not dreamed of a ruin so near and so complete. In a moment she saw fade from view all the happiness of the future that had been living in her day-dreams, and giving a roseate hue to the widening horizons of womanhood. The glowing colors of life changed before her eyes into the blackness of death and despair. Then, with the woman's instinct that seeks to comfort others, regardless of her own anguish, she sought to console him.

"How cruel I have been to reproach your sadness! How little did I think it had so terrible a cause! But tell me, Luis, can you devise no remedy?"

"None."

"Nothing but taking down the bridge, and rebuilding it?"

"Nothing less will avail."

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"Well, let us trust in God. Perhaps He will point out some way of escape. For me, I will go and pray to Our Lady for her help and guidance. I feel sure, Luis, that this evil will be averted."

There was no foundation for her hope, and yet it comforted him.

. . . . . .

It was the night before the day fixed for the final inspection of the bridge. To-morrow the archbishop will pronounce his solemn blessing on the work; to-morrow the scaffolding and trusses will be removed; to-morrow the bridge will stand forth, in all its glory, a proud ambition to the many beauties of the city; to-morrow —— The night was stormy: wind and rain had swollen the river into a torrent; and Luis, as he tossed restlessly upon his bed, almost prayed that its force might sweep away the entire structure. It would be a less disgrace than that which awaited him on the morrow. He arose, and stood at the window of his room. He looked out into the night. His eyes naturally sought the direction of the bridge, but there was nothing to be seen but blackness. Stay, what was that wandering flame? His heart seemed to stand still, as a dim white figure, bearing in its hand a burning torch, passed over the bridge. A light was thrown over one of the parapets. As the figure glided about the doomed bridge, its progress was marked by the springing up of lurid flames. Then the white and mystic figure vanished from sight, and — the bridge was in flames.

The timber-work burnt fiercely; the wind fanned the flames into fury, and the rain, instead of quenching, seemed to stimulate its power. Then, as the fire began to flood the sky with its lurid light, the city awoke. The great alarm-bell was rung, and hundreds of anxious citizens thronged the river's bank, anxious to help and save. It was in vain. Amongst the latest arrivals were the architect and the archbishop.

"This is a sad end of your work, my son," said the ecclesiastic, "but be not cast down. The bridge shall be rebuilt; and if, in the course of the erection of this one, you have found any thing that could be improved, the new one shall be even more magnificent than we had purposed this to be."

As the architect was gratefully acknowledging the archbishop's generosity, he saw Juanita with her father approaching.

"You are saved," she whispered.

"You are my preserver," he returned.

. . . . . .

The destroyed bridge was replaced by one of greater beauty, and there was no fatal flaw in the second design made by Luis. As for the beautiful incendiary, she became the wife of the architect. Before the marriage, she sought the palace of the archbishop, and, under the seal of confession, revealed the secret of her action. The good prelate, moved by the courage and devotion with which love had inspired her, not only forgave her crime, but caused her image to be carved upon the stone above the keystone of the arch, as an emblem of loyal love. There it stands to this day upon the Lady's Bridge. — *The British Architect.*

QUEEN ANNE.

When the third William, of pious memory, condescended to deliver this country from Popery and wooden shoes, he brought in his train other notions besides Protestantism and prunella. He was the means, for example, of introducing into English domestic architecture a Dutch element of detail, if not of outline, traces whereof still survive in our ancient village homesteads, and may especially be observed in the courtyards of hostelries in coaching towns. This Dutch graft harmonized admirably with the good old Elizabethan stock, to which, as an offshoot of the Renaissance, it bore the strongest affinity; and by degrees it fructified into what is now recognized to be a distinct style of domestic architecture, a style which, rightly or wrongly, bears the name of Dutch William's successor. Time brings its own revenges, and among them none is more characteristic of the periodicity of taste than the resuscitation of the Queen Anne style immediately after a revival of Gothic, which at one time promised to be both general and permanent. Gilbert Scott, however, no longer wields the wand of an enchanter, and the style which he strove so artistically to popularize lacks what the theologians term the grace of congruity. The contrast of modern costume and modern furniture, with mediæval ornamentation, savors too strikingly of anachronism; indeed, the very pictures themselves seem out of place in a chamber gorgeous with polychrome and panelling. On the other hand, the Queen Anne style dovetails exactly with our existing canons of taste. Chippendale furniture is a century later, yet it fits well with the home-like classicism of a Dutch interior. Old blue, bric-à-brac, dark oak Caroline cabinets and chests, huge antique picture-frames, all are equally in keeping, while the sumptuary ideas of the more ornate sex could easily gravitate in the direction of those massive robes wherein Sarah Jennings swore and Queen Anne ruled. As a matter of plain fact, the mode now in vogue would have suited even Helena Forment herself, not to mention those fair names known as "The Elephant" and "The Bumble Bee," who added something of grace, though not much of dignity, to the court of King George. The style, in short, adapts itself easily to the requirements of a rather luxurious and distinctly fastidious epoch, and at the present moment combines the rival attractions of novelty and antiquity. It offers as much in regard of absolute beauty as the elder Pugin could when he preached to an age saturated with Palladianism the gospel of Gothicism; while its pedigree, if not quite so long as that of mediævalism, is at least respectable, being two hundred years old.

To form an exact judgment on the merits and blemishes of this style, it is necessary to view with a critical eye its best models. There are some excellent examples in the new quarter of the town now building to the west of Sloane Street; in and about the Melbury road, Kensington; on the Embankment at Chelsea; and at Hampstead. The most ambitious, and perhaps not the least successful, effort to reproduce the style is, however, that of Mr. Norman Shaw, R.A., at Chiswick, where he has erected a township of villas which display the Queen Anne type of building under its every phase. Regarding these residences as so much tentative work of an artist who has identified his reputation with the style, it may fairly be argued that they challenge criticism, and this relatively even more than absolutely. A new mode of house-building is offered for the inspection of those especially who are interested in architectural progress, and here the two-fold question arises: Is it beautiful, and is it also sufficiently utilitarian? The answer to the former of these queries must in the main depend upon temperament and taste. To some people an inflexible regularity of outline is an essential; to others the elasticity of the Gothic style, which is fully shared by that of Queen Anne, loses its charms if not associated with mullions, tracery, gargoyles, and other mediæval accessories. There is, however, apart from prejudice, a certain positive beauty in the picturesque; and Mr. Norman Shaw may fairly lay claim to having constructed a picture in his well-grouped houses with their high-pitched roofs, their warm tints, and "fifteenth-century" bay-windows. South Kensington would indeed be up in arms, were such gems of design characterized as ugly, but of course the further question of utility is a different matter altogether. A home may be exceedingly lovely to look at, yet almost, if not quite uninhabitable. Æsthetic windows may admit draughts, and æsthetic traps sewer-gas. The arrangement of the interior from the basement to the attic may be the quintessence of inconvenience, while the chimneys may convey your smoke in any direction except upwards. If, however, the Queen Anne houses sin in any one of these respects, the fault is rather that of the architect or builder than of the style. In this cold Cimmerian climate of ours, warmth and light are the prime essentials of comfort. Of these, warmth depends upon a variety of considerations over and above architecture, while art, however, must be held responsible for the quantity of light vouchsafed. It is indisputably the most attractive feature of the Queen Anne style, that it never grudges daylight, bestowing as much as the construction will allow, and anon illumining the home from top to bottom with sunshine by means of a cupola or lantern, which crowns the sky-line, to the incalculable advantage of the appearance of the exterior. It is mainly on account of its munificence of the good gifts of Phœbus that this style has found such great favor with the artistic fraternity, to whom sunlight is bread, if not opulence; and if, as appears probable, the public, over and above the *dilettanti*, resort to the form and manner of dwelling affected by our ancestors in the days of Marlborough, utility will bring about that result far more than abstract æstheticism." Most of us have a predisposition in favor of honest red brick, and tiles of the same hue, together with high-stacked chimneys and big windows, in shape rather more attractive to the eye than a mere plain parallelogram; but if we probe the true cause why we relish these special details, we shall find that it is not because they are old English, nor because they are picturesque, still less because they chime in with some formula of artcant, but emphatically because they are suggestive of comfort. — *London Globe.*

THE PRESSURE OF WIND.

A paper was read by Mr. A. Buchan, at the last meeting of the Scottish Meteorological Society, on the "Storm of December 28, 1879," the day when the Tay Bridge fell. In two respects, he said, that was the most remarkable British storm he had ever examined. These were (1) the extraordinary fluctuations of the barometer that occurred during the time the storm lasted, and (2) the rapidity with which the cyclone advanced along the surface of the earth. The path of the storm was from Barra, in the west, across Ross-shire towards Orkney and Shetland. The average rate of the progress of the storm in the United States was about 26 miles an hour. In Great Britain and in Western Europe generally, 20 miles an hour was the ordinary rate of progress; it was often less, though sometimes it rose to 40 miles. The storm in question, from four to five P. M., travelled 30 miles; from five to six, 45 miles; from six to seven, 53 miles; from seven to eight, 70 miles; and from eight to nine, between 60 and 70 miles. It thus appeared that between seven and nine o'clock the storm advanced 140 miles. This had no connection with the velocity of the wind; it was merely the progressive movement of the storm. Along with the storm there came a rise of temperature from 49 to 55 degrees, which was the mean temperature of a night in June. This was another point which made the storm stand out as a most remarkable one. As to the velocity of the wind, Mr. Buchan mentioned that at Bidston observatory, near Liverpool, in a storm twelve years ago, a new pressure anemometer, which registered up to 70 lbs. to the square inch, was driven up to its full pressure and damaged. Here, then, was a case of wind with a force of 70 lbs. to the square inch at least, and it must have been above that. About four years ago there occurred a gust of wind at Sydney, Australia, which lasted two minutes, and during that time had a velocity of 150

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miles an hour. Taking ten or twelve minutes, its rate was 112 miles an hour. As to the storm of December 28 last, the following facts had been communicated by Mr. Scott, of the Meteorological Office, London: At Glasgow, between 6.20 and 7.20 P. M., the maximum velocity of the wind was 71 miles an hour; at Aberdeen, the maximum registered was 63 miles, between 8.50 and 9.50 P. M. At Aberdeen, from 7.15 to 7.20, the velocity was 76 miles per hour. At Seaham, near Sunderland, the hourly velocity was 40 miles at the time when the wind had its greatest strength. At 6.50, during a squall, the rate must have been 150 miles an hour. Mr. Buchan remarked that there could not be said to be any pressure anemometer in action in Scotland, that being the only instrument which could record with accuracy gusts of wind, and he hoped they might soon have a number of such instruments in various parts of the country. At Dundee, according to the local observer, the greatest violence of the gale was experienced at a quarter past seven o'clock. There were two things connected with the storm which struck him, — one was a crackling, rumbling noise in the upper air, which seemed to descend to the earth; and the other the great force which the wind exercised on standing objects, such as trees, chimneys, etc. That crackling noise, said Mr. Buchan, was observed in the great Edinburgh hurricane of twelve years ago. He had a note from Mr. Harvie Brown, of Dunipace House, Stirlingshire, who said that, about 7.20 P. M., about 1,800 cwt. of lead, weighing 8 lbs. to the square foot, was torn from the roof of his house like a sheet of paper. A part of that, weighing 3½ cwt., was carried 32 feet clear of the house, and the remainder was wrapped like an Ulster coat with a hood round one of the chimneys. He (Mr. Buchan) had endeavored to lay down the barometric gradients observed in this storm, but he did not find any of these so high as the steepest gradients which occurred during the Edinburgh hurricane. On that occasion there were thirty-three instances of solid masonry being blown down or damaged; but, so far as he learned, there was no such damage done in Dundee or anywhere in Scotland by the storm of December 28th to equal that.

Mr. St. John Vincent Day, C. E., spoke upon the great importance to engineers and bridge-builders of having accurate records of the velocity of the wind. Having seen remarks in the newspapers that the Forth Bridge had been passed by the railway authorities and the Board of Trade, he had made inquiries respecting the calculations on which it had been based, and he had found, on the authority of the Astronomer Royal, that only 10 lbs. per square foot had been allowed for wind pressure. Engineers had considered the matter, and he believed they had reported that with regard to wind pressures they had found nothing upon which they could place any dependence, except the old tables of Smeaton, which put down the pressure of the wind at from 7 lbs. to 12 lbs. and 13 lbs. to the square foot. Numerous wind pressures, Mr. Day showed, had been recorded since then by Professor Rankine, Professor Piazzi Smith, and Dr. Robinson, Armagh, the last-mentioned of whom had stated that the gusts of one particular storm, which was half a mile in breadth, blew at the rate of 125 miles an hour for six minutes continuously. What would become of the Forth Bridge in such a gale as that? But of course the bridge as at present devised was not going on. He had that from the Board of Trade. The report of the engineers had been set aside, and the strains as yet were still unsettled. As to the pressure on the Tay Bridge on the night when it fell, the wind would, of course, blow with much greater force down the conical valley of the Tay than it would in the open; and, according to Dr. Robinson, nearly one-third would have to be added to its velocity near the bridge, owing to the contraction there of the Firth. Dr. Robinson had also said he had no doubt that the vertical effect of the wind resisted by the water below and by the pressure of the head above would tend to lift up the whole bridge off the piers. On February 20, 1877, a storm was recorded at Holyhead, the gusts of which blew at the rate of 200 miles per hour; and on November 16 of the same year there was a storm which blew at 180 miles an hour. — *The Architect.*

EXTINGUISHING FIRES WITH STEAM.

MR. JOSEPH BIRD, a gentleman who is very much interested in all that concerns the extinguishment of fires, writes to the *Fireman's Journal* as follows: —

"It is very singular that this improvement has not been made in steam fire-engines. That a building on fire, but which has not burned 'out' to the air, can be, if not too large, instantly extinguished, and with one-tenth of the loss, especially if filled with merchandise, than it can be by water, is true beyond a doubt. Many of our great warehouses are so large that no one or perhaps two steamers could fill them, and thus they would not be saved in this manner, unless brick or iron walls are thrown across the buildings, as is the custom in Liverpool and London. I propose to describe the way the engines would be worked when this steam arrangement was made, and the steamers altered so as to throw steam as well as water. On arriving at a building on fire, the men would instantly perceive whether water or steam should be used; if water, the arrangement for work would go on as at present. If the fire was confined within the building, the steam-pipe would be got ready, while one man, with the proper sized auger, bored a hole for the steam-pipe into some door or window near the fire. That is all. Water or steam. Now one, then the other; and the property of the city vastly better protected by it, and at a very slight expense. Steam has often been tried at different times; and as it has been under difficulties, it has often failed. These failures were sure to have the widest circulation, while success has often been kept out of sight. All buildings in which steam is used should be prepared so as to extinguish their own fires, which would save a great amount of property to the owners, and often to others. Persons owning such buildings, and wishing to prepare them, may learn how simple the manner is by calling to see the kerosene-works of the Downer Company at South Boston. Of course such works, under the most careful direction, often take fire. If a fire occurs there, in a minute the doors are shut, and steam turned into the building from the outside. In from one to three minutes that portion of the buildings is crowded with steam, and the fire is out, when at its leisure the steam is allowed to escape, and the men go to their work again. One of the neighboring business men took quite an interest in this new way of getting rid of the dangerous element, and as the steam smothered out one fire after another, he became so excited as almost to wish that the fire would for once come off the conqueror. Hearing one day an unusual noise in that direction, he looked up and saw one of the buildings wholly enveloped in flames. 'There!' said he, 'now they will catch it!' and off he went, pell-mell, to get around to the front and witness the destruction: On his way he had to run a few rods out of sight of the fire. His last look showed no diminution of the flames; but when after a run of ten rods he came into full view, the steam had been turned on, and to his unbounded astonishment, not the slightest sign of fire could be seen! It would be very easy to bring about this much-needed change, as, when application was made for using steam-power in a proper place, it could be granted on condition that the parties should introduce steam-pipes for extinguishing fires. These would soon prove so efficient for that purpose, that all persons owning buildings using steam would find it for their interest to also introduce such pipes. There need be no fear that there will be too many ways to get rid of fires. It is because we have had but one string to our bow, and that sometimes lost for fifteen or twenty minutes, that we have so many fires, at last culminating in the conflagration of November."

THE PROPOSED BACK-BAY PARK, BOSTON.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — In a former note I showed the unsoundness of the premises pardonably taken for granted in the comments of one of your contributors upon the plan for this work. Will you please let me, for the reasons then given, also question those of the objection since raised to it by your correspondent W.

In presenting the plan to the Commissioners, three objections were anticipated, as to the grounds of which they were advised that my opinions should not be taken as authoritative, and three gentlemen, each eminent in his department of natural science, were consequently invited to examine the plan and give judgment upon the points thus placed in doubt. As the opinions obtained were given verbally and informally, they cannot be quoted; but for the present purpose it may be sufficient to say that one of the questions submitted was as to whether the conditions proposed would be particularly favorable to the breeding of mosquitoes, and that the answer was satisfactory to the Commissioners. Mosquitoes are believed to be less likely to breed under the intended circumstances than in the present Public Garden, and no good reason is known for supposing that any that may be bred will be of the "particularly malignant type" imagined by your correspondent.

Yours respectfully,

FREDERICK LAW OLMSTED.

THE NEW ALBANY CAPITOL.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — The cause of the cracking in the sandstone abutments in the grand corridor of the new Albany Capitol perhaps lies in the modification of style in the edifice. The description of the Assembly Hall in *Scribner's Monthly* for December, 1879, clearly explains the change in construction. The original design contemplated but light work in this hall as bearing upon the corridor-piers below; while the change made the piers under the granite columns take an additional load of half a million of pounds — more or less — in excess of the original design. It seems an incongruous attempt to put substantial Gothic stone vaulting of large span — upon which very likely the roof, and dormer rooms besides, have a support, — upon a structure below, not planned for such construction. Either the first designers put too much material in the lower stories and foundations, or the later designers have put too much on top of the original. The subject may be easily illustrated by diagrams from Messrs. McAlphine, Fuller, and Eidlitz, for the attention of the architect and builder.

V.

PUBLICATIONS RECEIVED.

ILLUSTRATIONS OF THE HISTORY OF ART. Part V. The History of Painting from the time of the Egyptians to the close of the Eighteenth Century. Boston: L. Prang & Co., 1879. Price $2.50.

MATHEMATICAL DRAWING INSTRUMENTS AND HOW TO USE THEM. By F. Edward Hulme, F. L. S., F. S. A., Art-Master of Marlborough College, Author of "Principles of Ornamental Art," "Familiar Wild Flowers," "Suggestions in Floral Design," etc. Approved by the Science and Art Department. New York: Bicknell & Comstock, 1880. Price $1.50.

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NOTES AND CLIPPINGS.

An Elevated Electric Railway for Berlin. — The council of magistrates of the city of Berlin had under consideration, a short time ago, a proposal, submitted by Messrs. Siemens and Halske, for the construction of an electric railway across a portion of the capital. There will be two lines of rails, one for the up and the other for the down journey. The lines will be carried on iron pillars 14 feet 9 inches high, and nearly 83 feet apart. These pillars will be placed along the edge of the footpath, so as to cause the least possible interference with the ordinary traffic. The carriages will be narrow and short, containing ten sitting places and four standing places. The electro-dynamic machine, which will propel the carriages, will be placed under the floor of the carriage between the wheels, and a steam engine of 60 horse-power, which will be employed in the production of the electricity, will be placed at the terminus. The stoppages will be very few, and the rate of speed will be, it is expected, about 20 miles an hour. The chief object of the undertaking is to convey persons quickly across the city, and especially to facilitate access to the city line of railway. The chief objection raised is that the carriages will pass along at the level of the first floor of the houses in the streets which it will traverse, and it is feared this will lead to a depreciation of property. The magistrates have appointed a special commission of engineers and architects to examine into and report upon the proposal.

The Ashtabula Bridge Disaster. — The recent accident to the Tay Bridge has led engineers to reconsider the causes that may have occasioned some of the hitherto unexplained disasters to bridges. Amongst others General Budlong A. Morton, of New Haven, writes as follows about the fall of the Ashtabula bridge in 1876: —

"At the time this bridge was built, the science of bridge-building was in its infancy. It has scarcely reached a youthful stage at the present time. We had made but little progress in the study and knowledge of the elemental forces. Wind, a factor which was but little understood at that time, and whose variable forces are but slightly understood by a few at the present, was not considered to the extent of providing against its power. When we take into consideration the shape of the valley of the Ashtabula Creek from the bridge to the lake, together with the velocity of the wind at the time, we find, by the concentration of two currents of wind at the point of contact with the bridge, that the force applied laterally to the bridge exceeded 42,000 pounds. That, combined with the upper current of wind from the northwest, striking the train at an angle of 45 degrees, at a velocity of 60 miles an hour plus the speed of the train, 15 miles, equal to 75 miles per hour, or a resistance of 23 tons to the square foot, would seem to clear away the mystery as to the cause of the accident. There was a pressure upon that bridge at that time that no human foresight could have foretold."

A New Metallic Compound. — A new metallic compound, applicable to many artistic and industrial purposes, has been recently announced in England. The substance belongs to the class known as the thiates, or sulphur sulphides. Nearly a year ago Mr. J. Berger Spence discovered that sulphides of metals combined with molten sulphur formed a liquid. This liquid, on cooling, became a solid homogeneous mass, possessing great tenacity, and having a peculiarly dark gray, almost black color. It has a comparatively low melting point, viz., 200° Fahr., or rather more than 100° above the temperature of boiling water. It would thus require only a small amount of fuel to reduce or to melt it. The new compound also expands on cooling, — a property not shared by the majority of other metals or metallic compounds. For such purposes as joining gas or water pipes this expansion is of great importance. It is also claimed that the new compound resists favorably atmospheric or climatic influences, as compared with bronze or marble, and its resistance to acids is much superior to that of other metals or metallic compounds. These qualities, if sustained by further experience, would certainly render the new compound very useful in many ways.

Artesian Well in Boston. — At present an artesian well is being bored in Boston under the direction of Mr. J. A. Whipple, in order to determine whether or not there is under the city an adequate, available supply of pure water. The experience of the men engaged has been as follows: They first bored through six feet of hard filling; then met with a stratum of some soft black substance in a semi-fluid state, about forty to forty-five feet in thickness. Below this they found from ninety-three to ninety-seven feet of stiff blue clay, overlying a stratum of coarse gravel, in which they found a small stream of excellent pure water. After this they again encountered a twenty-foot vein of the stiff blue clay mentioned before, having passed through which they struck a solid bed of hard slate rock or shale, which necessitated the use of the rock-drill, which they are using up to the present time. At the depth of three hundred feet they struck a second small stream of good water in the slate rock. They have now reached a depth of about three hundred and seventy-five feet. The tubing they put down measures eight and one-half inches, outside diameter, and is one-fourth of an inch thick. The weight now operating on the rock is about 3,000 pounds, the drill itself weighing about 1,600 pounds.

The Destructive Forces of Nature. — During the years between 1871 and 1876, the average loss to life and property in France, inflicted by the phenomena of nature, was distributed as follows: —

By ice and frost	153	million francs.
" hail	83	" "
" fire	39	" "
" storms and floods	38	" "
" cattle-disease	32	" "

Another Chance for Architects. — Prince Demidoff is to build a new palace at Pratolino, near Florence, and all the leading architects of the world are asked to compete in designs for it. He has sold his art collection because he had become weary of it, and wishes to form a new one.

Mr. Lorillard's Mexican Expedition. — The New York *World* says: M. Désiré Charnay, who is to conduct the Lorillard expedition to Mexico, is already familiar with the field he is about to enter. As long ago as 1857 he visited both Mexico and Central America on a mission from the French Government to explore the ruins first described by Mr. John L. Stephens. On that occasion he took many photographs of the temples, monuments and tombs of Mitla, Palenque, Chichen-Itza and many other interesting points, and on his return with them to France he published an atlas of them, together with a companion volume entitled "Cités et Ruines Américaines." All monuments and objects of interest to antiquarians and historians which may be discovered during the expedition, and which can be safely and conveniently removed, are intended, with the consent of the Mexican authorities, to become the property of the French Government, and are to constitute a separate museum. Casts and photographs will be taken of all the monuments, bas-reliefs, inscriptions and objects of interest obtained or visited, and these will become the property of Mr. Lorillard. A Mexican statute now in force forbids the transportation out of the country of such objects as those embraced in the scope of this interesting expedition. Señor Zamacona has stated that it is possible that the rigor of this law may be abated in favor of the Lorillard expedition. Of this we, bearing in mind the way in which Dr. Le Plongeon was treated in his attempt to remove the great statue of Chaacmol, have grave doubts.

Central American Appreciation of Art. — Some years ago the Empress Eugénie presented a colossal bronze statue of Columbus to the town or settlement of Aspinwall, at the Isthmus of Panama. The place is now called Colon, as it is supposed that the discoverer visited the coast on his second voyage. The negroes, ship-chandlers, and agents, who constitute the inhabitants, care little for works of art, and, according to a traveller who lately visited the place, they hesitated about accepting the gift because they objected to pay the freight, till the captain of the steamer who had brought it, vexed and perplexed, flung the statue or group (Columbus is represented as sheltering the young State of Colombia, in the shape of a feather-crested Indian maiden, under his arm) into the mire of a swamp on the shore. There it lay ignominiously year after year, till it was at last fished out by the manager of the railway company, who wished it to be part of the pageantry of the inauguration of the line. They set the statue on the ground, upright, but set it up hastily and clumsily, without basement or pedestal, on the bare ground, where it remains to this day, hardly protected by a rough wooden paling which lets in dogs and pigs, and harbors them like a happy family at the great man's feet; a very "pearl" of European art thrown away, in defiance of the old wise saw, on these unappreciative Transatlantic "swine." — *The Architect.*

The Palenque Tablet. — In "The Palenque Tablet," by Charles Rau, published by the Smithsonian, the author says of this famous bas-relief of Yucatan, described by Waldeck, Stephens, Morelet, and Charnay: "Considering that signs, or parts of signs, for months, and more particularly such as denote days, occur in conjunction with numbers expressed by bars and dots on the Tablet of the Cross, I venture to suggest that its inscription constitutes a chronological record of some kind. The central group of figures probably illustrates one of the events narrated, or indicated, by the surrounding glyphs." This cautious statement by Dr. Rau appears to have been based upon inferences drawn from manuscripts of Mexican and other tribes, handed down from the time of the Spanish conquest.

How Bric-a-Brac Shops are Supplied. — The *American Art Review* mentions that a man was lately caught in the garden of the Tuileries trying to break a statue. He stated that he was a dealer in *débris;* that it was his occupation to break statues, statuettes, bas-reliefs, and to sell them for export. He affirmed that the English are the best customers for wares of this sort. An advertisement in the London *Times* having offered for sale "the materials of the cloister of the Carmelites of Pont l'Abbé, built in 1383," the municipality of that place has contributed 1,500 and the French Government 2,000 francs, in order to gain possession of the property and keep it in France.

A Burglar-proof Key. — A machinist in Nevada has invented an effective improvement on the common door-key, which renders it impossible for a burglar to use the key in opening the lock by taking hold of it with nippers from the outside. The end of the key is made to revolve independently of the key itself, and a thief may turn it round forever without moving the key.

Raw and Manufactured Iron. — From seventy-five cents' worth of iron ore may be developed, it is said, $5.50 worth of bar-iron, $10 worth of horse-shoes, $180 worth of table knives, $6,800 worth of fine needles, $29,480 worth of shirt-buttons, $200,000 worth of watch-springs, $400,000 worth of hair-springs, or $2,500,000 worth of pallet arbors (used in watches).

An Old American Theatre. — It is said that the oldest theatre in America is the Savannah Theatre, which was built in 1803. It is a massive building of brick and stone, and has never been remodelled or changed in any way. The architect was an Englishman, who was brought to America by the Blake brothers, two wealthy South Carolina rice-planters, who at that time resided in Savannah.

A Legal Decision. — A builder cannot recover from the owner of the property for damages to a building in process of construction, where the contract was for a gross sum, and there had been no delivery or acceptance of the part by the owner. Such a contract is not separable. Such is the decision of the Michigan Supreme Court in a recent case of Filden *vs.* Besley. It follows from this that the insurable interest in such a building would ordinarily be confined to the builder, unless acceptance or advances of some kind had made the owner liable to loss. —*The Insurance Monitor.*

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BUILDING INTELLIGENCE.

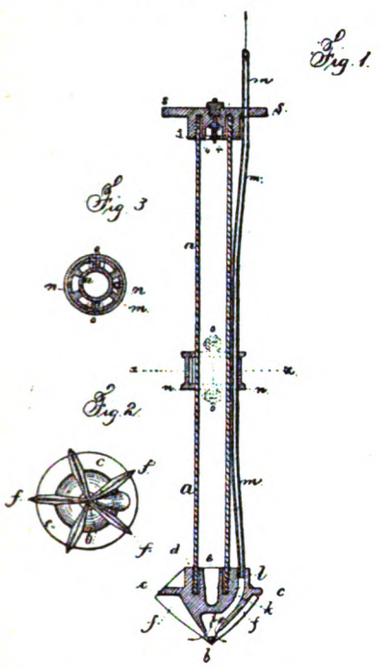
[Reported for The American Architect and Building News].

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

225,061. TUBULAR PILE.—Job Johnson, Brooklyn, N. Y. The pile is a metal tube, *a*, at the bottom of which is a shoe having a conical point, *b*, a horizontal disk, *c*, two short vertical cylinders, *d* and *e*, upon the upper surface, and inclined cutting blades *f*, *f*. The lower end of the tubular pile *a* is entered into the annular space between the short cylinders *d*, *e*, and is securely leaded therein, the object being to render the tubular pile perfectly water-tight at the lower end, and to prevent the parts working loose as the pile is revolved in sinking it. The cutting-blades, *f*, extend at their upper end beyond the edge of the disk, *c*, so that in passing through shale, gravel, or hard substances, the hole that is made by rotating the pile will be larger than the disk, and give opportunity for the same to descend freely, and also for the water and



refuse meterial to rise. In some instances the water-supply has been through the column, the delivery being central between the scrapers. In this instance a core of hard material is left that may close the delivery-orifice. In other instances the water-supply has been by a pipe that passes through the disk at the lower end of the pile. In this instance the action of the water has not been central, and the pile is liable to be displaced. Both these difficulties are avoided by providing a central water-chamber, *i*, above the conical points of the scrapers, opening into the spaces between all the scrapers, and from this chamber the pipe, *k*, or water-way, passes up in the shoe to the socket, *l*, into which is screwed the lower end of the water-supply pipe, *m*. Thus the water is central in its washing action; the pile is kept central as it is forced down, and the scrapers drill into any hard substance, and make an opening sufficient for the passage of the disk, *c*. After the pile has been sunk the tube *m* can be unscrwed and used with the next pile. In sinking the pile it is necessary to rotate it. A sectional clamping-drum is therefore used that is made of two or more parts, *n*, *n*, bolted together. There are two inward ribs that extend from the cylindrical part of the pulley to the tubular pile, so as to firmly hold the pile when the pulley is bolted together, and at the same time there are spaces between the ribs, through which the water-pipe, *m*, can pass. The pulley and pile may be rotated by a belt driven by suitable power, or a common pipe-wrench may be used. The cap, *s*, of the pile is made with two short cylinders, 3, and 4, between which the upper end of the tubular pile is received and securely fastened by lead, so as to be air-tight, and through this cap is a hole with a valve-seat. The valve, *r*, fits this seat, and it may open either inward or outward.

226,149. WRENCH.—James H. Alexander, Mystic River, Conn.

226,173. SASH-LOCK AND LIFTER. Thomas A. Ireland, Cincinnati, Ohio.

226,180. METALLIC PACKAGE FOR PAINTS, ETC.—John W. Masury, New York, N. Y.

226,185. TUBULAR WELL.—John A. Newell and Ary Lucasse, Kalamazoo, Mich.

226,188. APPARATUS FOR DRYING BRICKS.—Wilhelm Pieper and Jonathan Creager, Cincinnati, Ohio.

226,190. BOLT-CUTTER.—Henry K. Porter, Boston, Mass.

226,215. COMBINED VENTILATOR AND CHIMNEY.—Albert T. Wheeler, Springville, N. Y.

226,224. VALVE FOR WATER-CLOSETS.—John Demarest, New York, N. Y.

226,237. IRON PILE.—Isaac W. Marlay, Metuchen, N. J.

226,243. KNOB-ATTACHMENT.—Emery Parker, New Britain, Conn.

226,244. KNOB-ROSE ATTACHMENT.—Emery Parker, New Britain, Conn.

226,246. LATHE CHUCK.—Charles H. Reid, Danbury, Conn.

226,256. MACHINE FOR MOULDING AND COMPRESSING ARTIFICIAL BLOCKS OR BRICKS.—Alfred Walker, Sing-Sing, N. Y.

226,282. FIRE-PROOF FLOOR.—John Copcutt, Yonkers, N. Y.

226,306. HINGE.—John J. Gordon, Flint, Mich.

226,312. SASH FASTENER.—Martin Hameline, Joplin, Mo.

226,318. WINDOW SHUTTER.—David Huston, Boston, Mass.

226,320. SHUTTER-WORKER.—John B. Jewell, Carrollton, Mo.

226,330. PASSENGER ELEVATOR.—Horace M. Lee, Boston, Mass.

226,339. MONKEY-WRENCH.—John Moffet, New York, N. Y.

226,353. TRANSOM LIFTER. Frank A. Reiher, Chicago, Ill.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS.—The following building permits have been issued since the last report:—

Jas. H. & J. T. Phister 13, two-st'y brick buildings, Eastern Ave., between Cannon and Fort Sts.

Hamill, Brown & Co., three-story brick building, 37' x 85', cor. Fawn St. and Falls Ave.

Henry Slickerman, three-story brick building 28' x 99', Washington Road, between Stockholm and Wooster Sts.

Amanda J. Price, three-st'y brick building. 14 James St., between Central Ave. and Somerset St.

J. Freeman Rasin, three-st'y brick dwell., 24' x 70', cor. Calvert and Chase Sts.

Jos. M. Cone, 6 three-story brick dwells., 18' x 60', Franklin St. between Pine and Pearl Sts.

Jos. M. Cone, 12 three!story brick buildings, 16' x 58', Hill Ave., between Bloom and Prisstman Sts.

CHURCH.—Mr. Frank E. Davis is preparing drawings for a new M. E. Church, 48' x 85', to be built on the corner of Montgomery and Sharp Sts., of brick with stone finish; cost, $18,000.

PARSONAGE.—Messrs. Dixon & Carson are preparing drawings and specifications for a new parsonage for the First Presbyterian Church, cor. Park and Madison Sts.; also for extension of church. The parsonage is to be of brick with stone finish, 23' x 85', three stories high; the new building and extensions are to cost $35,000.

STOCK EXCHANGE.—Steps have been taken for building a new Stock Exchange, the option of a site is held, and preliminaries have been arranged. The site in view is in the immediate neighborhood of South and Baltimore Sts.

Boston.

BUILDING PERMITS.—Since our last report the building permits granted are as follows:—

Brick.—11 *Oliver St.*, 1 store, for B. M. Jones, 24' x 110'.

Lewis St., for Boston Sugar Refinery, 1 kiln house, 45' x 75', and 1 boiler house, 40' x 65'; S. F. Whitehouse, builder.

Emerson St., No. 14, for H. Souther, 2 dewlls., 17' x 37'; L. Locke, builder.

St. James Ave., for H. B. Williams, 6 houses, 24' x 65'; Standish & Woodbery, builders; Wm. R. Emerson, architect.

375–79 *Marlboro St.*, for G. Wheatland, Jr., 3 dwells., 23' x 42'; Vinal Dodge, builder.

341 *Commonwealth Ave.*, for N. W. Rice, 1 dwell., 27' x 71'; A. H. Caton, builder; Kerby & Lewis, architects.

232 *Commonwealth Ave.*, for A. A. Wheelock, 1 dwell., 20' x 58'; G. A. Avery, architect.

Mechanic St., Ward 5, for J. Gahm, 1 tenement house, 36' x 58', three stories, and table, 20' x 30'; F. H. Tarbox, builder, L. Weissbein, architect.

133 *Marlboro St.*, for C. W. Freeland, 1 dwell., 30' x 65'; J. & H. M. Harmon, builders.

Wood.—*Melville Ave.*, Ward 24, for J. W. Field, 1 stable, 30' x 40'; McNeil Bros., builders.

10 *Victoria St.*, 5 dwells., 22' x 32'; D. H. McKay, owner and builder.

Ware St., Ward 24, for F. King, 1 dwell., 27' x 30'; E. McKechnie, builder; J. A. Fox, architect.

Wyoming St., for N. E. Temple, 1 dwell., 31' x 32'; T. Russell, builder.

Mechanic St., Ward 5, for J. Gahm, 1 carriage house, 30' x 43'; F. H. Tarbox, builder; L. Weissbein, architect.

Pleasant St., Ward 24, for M. A. Sawyer, 1 dwell., 35' x 44'; McNeil Bros. builders.

HOUSES.—Messrs Kirby & Lewis are the architects of two new houses for Mr. A. H. Caton, and one for Mr. N. W. Rice, 337, 339, and 341 Commonwealth Avenue. No. 327 is built by J. W. Tobey, the others by Mr. Caton. All are of brick and red sandstone. Foundations now building.

On Marlborough St. are soon to be built two houses; one for Mr. F. H. Skinner, to be built by A. H. Caton, and the other for A. E. Harding, by S. W. Merrill. Messrs. Kirby & Lewis are architects for both.

Brooklyn.

ALTERATIONS.—*Ninth St., No.* 359, mansard roof, also three-st'y brick extension, 15' x 58.6'; cost, $6,495; owner, Jose Gomez, on the premises; architects, W. Field & Son; builder, M. Ryan.

Broadway, No. 52, two-st'y brick extension, 20' x 24', cost, $2,000; owner, D. Fedden, on the premises; carpenter, Wm. Kohlmeier.

Lafayette Ave., No. 114, one-st'y brick extension, 18' and 14' x 38'; cost, $40,000; owner, Michael Snow, on the premises: architect, M. J. Morrill; builders, J. B. Rutan and Wright & Brook.

BUILDING PERMITS.—*Ash St.*, one three-st'y frame storehouse, 20' x 70'; owner and builder, Church & Co., 36 Ash Street; architect, A. Sterns; mason, J. B. Woodruff.

Buffalo Ave., cor. Butler St., one two-st'y frame store and dwelling, 27.9" x 50'; owner, Henry Pich; builders, James Hickey and John Duhy.

Myrtle Ave., one three-st'w brown-stone store and flats, 25' x 56'; cost, $7,000; owner, James Carey, cor. Clermont and Lafayette Avenues; architect, R. Dixon; builders, Long & Barnes.

Baltic St., one two-st'y brick stable, 23' x 45'; cost, $1,800; owner, Mrs. McLaughlin, Warren Street; architects, M. Freeman & Son; builders, John R. Scott and Coyne & Feeney.

Nassau St., cor. Liberty St., one six-st'y brown-stone Publishing House, 77' x 100' x 75' x 100; owner, A. S. Barnes, Clinton Avenue; architect, C. C. Buck; builder, G. H. Stone.

Park Ave., six three-st'y frame tenements, 20' x 45'; owner, E. W. Brunsen, Bristol, L. I.; architect, Isaac D. Reynolds; builders, John Lambert and Thomas Donnelly.

Monroe St., No. 305, one two-st'y front brown-stone dwelling, 16.8' x 42'; cost, $4,200; owner, David Weild, 307 Monroe Street.

Pacific St., N., one three-st'y brick dwelling, 25' x 65' x 29.4' x 65'; cost $16,000; owner, George L. Weed; architect, John Mumford; builders, James Ashfield & Son.

State St., one four-st'y brick tenement, 30' x 43'; owner, Thomas Colson, 281 Atlantic Avenue; architect, Charles Werner.

Butler St., one one-st'y frame building, 86'9" x 23'; cost, $2,000; owner, William Bradley, 548 Sackett Street; builders, William H Hazard & Son.

Park Ave., cor. Graham St., one one-st'y brick storehouse, 69' x 62'; cost, $3,000; owners, Tucker, Carter & Co.; architect, A. V. B. Bush; builders, John Mahony and B. Banks.

Pacific St., two three-st'y brown-stone dwellings, 20' x 55'; owner, James F. Whitney, 1234 Pacific Street; architect, Geo. P. Chappell; builders, Cornelius King and Powderly & Murphy.

St. John Pl., seven three-st'y brown-stone dwellings, 20' x 45'; cost each, $6,500; owner, Isabella Gordon; architect, R. Dixon; builder, John Gordon.

Chicago.

BUILDING PERMITS.—*Paulina*, near Blue Island ave., 2 two-st'y office and dwell., for M. Lowenthal; cost, $4,000.

Kinzie and Wells sts., two and one-half-st'y depot, and one story express building, 150' x 200', for the Northwestern Railway Company; cost, $100,000.

Third Ave., No. 183, two st'y dwell., for R. Weber; cost, $4,000.

West Chicago Ave., No. 425, three-st'y dwell., for H. Schruerdfeyer; cost, $3,500.

Archer Ave., and Keeley st., two-st'y dwell., for A. Frink; cost $6,000.

Cincinnati.

BUILDING PERMITS.—The following building permits, amongst others, have been issued during the month of March:—

Thirty-four permits for repairs, total cost, $13,850.
G. Differns, two-st'y brick; cost, $5,000.
Cotteral & Son, three-st'y brick; cost, $5,000.
H. Muller, three-st'y brick; cost, 3,500.
Fred Luecke, two-st'y brick; cost, $2,500.
Jas. H. Rowe, two-st'y frame; cost, $2,000.
H. Hosbrock, two-st'y brick; cost, $6,000.
S. Richards, three-st'y brick; cost, $8,000.
B. Wessel, three-sto'y brick; cost, $4,500.
G. G. McGarvey, five-st'y brick; cost, 2,200.
E. A. Bickell, four-st'y brick; cost, $5,000.
J. H. Schawe, four-st'y brick; cost, $3,000.
John Robinson, addition; cost, $2,000.
Conrad Kuhl, three-story brick; cost, $4,000.
F. Reichert, two-st'y brick; cost, $3,000.
Ohio Salt Co., four-st'y brick; cost, $6,000.
J. Krohmer, three-st'ry brick; cost, $4,000.
James Griffith & Son, three-story brick; cost, $6,000.
Thomas Emery's Sons, five-st'y brick; cost, $10,000.
Thomas Emery's Sons, five-st'y brick; cost, $8,000.
Thomas Emery's Sons, 14 two-st'y brick; cost, $150,00.
W. McCannon, 4 four-st'y brick; cost, $11,000.
Total permits for the month, 63.
Total cost for the month, $181,600.
Total permits to date, 149.
Total cost to date, $372,075.00.

New York.

BUILDING PERMITS.—*One Hundred and Twenty-seventh St.*, for Mrs. Annie Fettrich, Wm. B. Tuthill, architect, 316' x 52' and 115' x 52', 4 brown-stone dwells.; cost, $40,000.

Madison Ave., cor. One Hundred and Twenty-seventh St., for Isaac E. Wright, J. H. Valentine, architect, 1 brown-stone house, 19' x 50', J. C. Wright, builder; cost, $12,000.

Madison Ave., for Isaac E. Wright, J. H. Valentine, architect, 3 brown-stone houses, 19' x 50', I. E. Wright, builder; cost, $30,000.

One Hundred and Thirty-sixth St., between Alexander and Willis Avenues, for Thos. J. O'Kane, Jno. Roger, architect, J. O'Kane, builder, 4 brick dwells., 17'6" x 40'; cost, $20,000.

West Thirty-sixth St., a brick five-st'y tenement, 25' x 65', John Totten, owner, C. F. Ridder, Jr., architect; cost, $10,000.

West Fifty-third St., a similar building, four stories high, 25' x 50', John Maher, owner, Andrew Ewald, builder; cost, $7,000.

West Thirty-seventh St., No. 312, a similar building, 26' x 50', Jacob Wenner, owner, G. Holzeit, architect; cost, $8,000.

One Hundred and Twenty-third St., a four-st'y brown-stone front tenement, 25' x 65', Jacob Weeks, owner, John Brandt, architect; cost, $10,500.

Third Ave., cor. Sixty-fourth Street, for Wm. A.

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Winter, three stores, wood and glass, 25′ x 30′; cost, $3,000.

Seventy-ninth St., for J. Klenow, Wm. Fairchild, architect, one brick store, 27 x 30; cost, $1,500.

ALTERATIONS. — *Thirty-seventh St., W., No.* 12, a fourth st'y to be added; cost, $4,000; owner, Howard Lapsley; architects, Gambrill & Ficken.

Thirty-fourth St., W., No. 108, a fifth st'y to be added, and a three-st'y brick extension, 15.3′ x 10′, to be built; cost, $4,000; owner, Dr. F. N. Otis; architects, Gambrill & Ficken.

Fifth Aave. cor. One hundred and twenty-fifth St., church damaged by fire to be repaired; cost, $30,500; owners, Church of the Holy Trinity; architect, Henry Dudley; masons, Lyons & Bunn; carpenter, Edward Smith.

Eleventh Ave., cor. Thirty-ninth St., store front to be changed and internal alterations; cost, $2,000; owner, G. Wiley; architect, C. F. Ridder, Jr.

Ninth St., E., Nos. 319 *and* 319½, four-st'y brick extension, 16′ x 37′, and internal alterations; cost, $10,000; owner, Robert Stuyvesant; architect, S. D. Hatch; builder, John Molloy.

Grand St., No. 398, store front and interior alterations; cost, $2,500; owner, Mrs. Laura Wilks; architect, S. D. Hatch; builder, I. H. Decker.

FACTORY. — On the corner of Twenty-eighth Street and First Avenue, a factory, 50′ x 45′, five stories high, is to be built for W. S. Loeb, for occupation by Messrs. Hater Bros., at a cost of about $19,000. Messrs. H. J. Schwarzmann & Co., are the architects, and Marc Eidlets the contractor.

HOUSE. — An extension to the house of Dr. H. B. Millar, 45′ x 15′, at No. 4 East Forty-first Street, is to be built from designs of Mr. Wm. B. Bigelow; the interior decorations will be very elaborate.

OPERA-HOUSE. — The Metropolitan Opera-House Co., has been duly organized, and is now considering the purchase of a lot of land 200 feet square, the cost of which and the building to be erected thereon is expected to be $600,000.

STORE. — Mr. S. A. Warner has prepared plans for a store on Greene Street, 50′ x 100′, and is now receiving estimates.

STORE. — A four-st'y store of brick with stone finish, 26′ x 113′, is to be built at No. 106 Greene Street, for Mr. D. L. Bennett, Mr. H. Fernbach is the architect.

TATTERSALLS. — Mr. Wm. K. Vanderbilt has purchased the property on the corner of Fiftieth Street and Seventh Avenue, for $200,000, and has leased it to the New York Tattersall Co., who will build a suitable building.

WAREHOUSE. — A large warehouse and factory is to be built on the corner of Beech and Greenwich Streets, from the designs of Messrs. Laban & Son, of Jersey City.

Philadelphia.

ASYLUM.—The corner-stone of the Philadelphia Home for Incurables, Forty-eight Street and Woodland Avenue, was laid April 14.

BREWERY.—*Thompson St., No.* 32, 1 four-st'y brewery, 72′ x 146′; contractor, J. B. Doyle.

DEPOT. — *Front St.*, cor. Pine, freight depot, 49′ x 444′; owners, Penn. R.R. Co.; contractors, W. F. North.

FACTORIES. — *Washington Ave.*, cor. Twentieth, 1 three-st'y factory, 45′ x 73′; owners, "The American Sewing Machine Co.; contractors, A. & T. Doane.

Fourth St., cor. Montgomery, four-st'y factory, 40′ x 24′; owners, J. B. Stetson & Co.; contractors, Stephen Morris & Son.

Pine St., No. 1920, four-st'y factory, 48′ x 43′; contractor, John O'Donnel.

Fifth St., nor. Butler, one-st'y factory, 40′ x 70′; owner and builder, David Manny.

North Thirteenth St., No. 125, five-st'y factory, 20′ x 104′; Jas. Howard & Co., builders.

Tenth St., cor. Reed, one-st'y wagon factory, 16′ x 155′; contractor, C. Bachle.

FOUNDRY. — Plans are being drawn by Wilson Bros. & Co., architects of this city, for a foundry 65′ x 100′; machine-shop, 115′ x 50′; rolling mill, 355′ x 175′; for Colorado Iron & Coal Co., at Pueblo, Colorado.

HOUSES. — *Nassau St.*, cor. Twenty-fourth, 10 two-st'y houses, 14′ x 33′; J. L. Cane, owner and builder.

Lehigh Ave., West of Eleventh, 4 three-st'y dwell., 18′ x 62′; owner and builder, A. J. McClary.

Girard Ave., Nos. 411–415, 3 three-st'y dwellings and stores, 17′ x 47′; Thos. McCarty, contractor.

Powelton Ave., cor. Thirty-sixth, three-st'y dwell., 40′ x 64′, E. & A. L. Pennock, contractor.

Merine St., North of Diamond, 31 two-st'y dwell., 14′ x 56′; owner and builder, H. R. Shock.

Wellington St., North of Columbia Ave., 8 three-st'y dwell., 14′ x 46′; owner and builder, J. S. Albright.

STORE. — Messrs. Merchant & Co. are building on Arch Street a four-story iron-front building, 25 by 85 feet, which will be an addition to their present store.

Christian St., cor Twenty-third, three-st'y store and dwell., 18′ x 50′; John Cunningham, contractor.

Chestnut St., No. 1618, three-st'y store, 20′ x 70′; Thos. Little, contractor.

Main St., North of Walnut Lane, three-st'y store, 18′ x 68′; owner and builder, D. S. McNab.

South Sixth St., Nos. 18 *and* 20, 2 five-st'y stores, 20′5″ x 173′; owner, T. Megarge.

Market St., No. 718, 1 four-st'y building, 24′ x 286′; contractor, J. B. Doyle.

WAREHOUSE.—*North Second St.*, W. 825, 1 three-story warehouse, 20′ x 80′; builder, W. C. McPherson.

St. Louis.

BUILDING PERMITS. — Thirty-two permits have been issued since our last report, six of which are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows: —

Owners.	Use.	Stories.	Rooms.	Cost.
St. Louis Wire Mill Co.	Mill.	1	1	$3,300
W. L. Lockwood.	Dwelling.	2	7	5,400
Eau Claire Lumber Co.	Stable.	2	2	3,000
H. S. Turner,	Store & Offices.	2	8	3,700
Mrs. Emile Lack,	Dwelling.	3	8	3,500
H. Trusdmann,	Dwelling.	3	8	6,000
Brower & Bro.,	Box Factory.		2	3,800

General Notes.

BRATTLEBORO, VT. — The Methodists have begun their new church on Elliott Street.

CEDAR RAPIDS, IO. — Mr. F. M. Ellis, of Marshalltown, Iowa, is the architect of the opera-house, 61′ by 140′, which is to be built for Judge Green & Son; cost, $45,000.

Mr. Ellis is also to build three stores, 60′ by 100′, for Barton & Patch; cost, $12,000.

CHIPPEWA FALLS, WIS. — The contract for building a theatre has been let. The auditorium will be 65 by 70 feet; stage, 20 by 70, and the curtain opening 30 feet wide.

DAYTON, O. — The Baptist Union is considering plans for a new church, to be built at the corner of Clay and Van Buren Streets.

DES MOINES, IO. — The Capitol Commissioners have decided that the interior or the building cannot be completed for the Nineteenth General Assembly.

DETROIT, MICH. — Mr. M. S. Smith is the architect for the new store of Messrs. Newcomb, Endicott & Co., on Woodward Avenue.

FALL RIVER, MASS. — Work has begun on St. Joseph's Church. It will measure 72′ x 130′.

FLINT, MICH. — A site for the proposed opera-house has been decided upon, and sufficient means pledged to insure its erection.

HAMPTON, IO. — Mr. F. M. Ellis, architect, of Marshalltown, Io., is building for George Beed & Co., a hotel-block 120′ by 132′, and three stories high. It is to contain seven stores, one bank, and sixty rooms; cost, $40,000.

HARTWELL, O. — The corner-stone of the new Episcopal Church was laid April 8.

HARRISBURG, PA. — Mr. F. E. Davis, of Baltimore, Md., is preparing drawings for a new chapel and Sunday-school, for the German Reform Church. It is to be built of brick and stone, and will cost between $12,000 and $15,000; dimensions are 45′ x 97′.

JOLIET, ILL. — The Board of Trade talk of building a large grain elevator.

LA CROSSE, WIS. — Mr. C. F. Struck, architect, is preparing plans for an ice-house for C. & J. Michel. Cost, $10,000.

LISBON, IO. — A church for the United Brethren, with a seating capacity of 600, is to be built by Mr. F. M. Ellis, of Marshalltown, at a cost of $8,000.

LOUISVILLE, KY. — Joe Demmzio to alter a three-story brick store on Jefferson Street, between Third and Fourth; cost, $5,000.

LYNN, MASS. — The corner-stone of the new Young Men's Christian Association building, was laid on Thursday, April 8.

MANSFIELD, O. — Plans for the new opera-house, architects Messrs. Gibbs & Cobb, are now ready for the decision of the Board of Directors.

MARSHALLTOWN, IO. — Mr. O. L. Binford is building house from the designs of Mr. F. M. Ellis, at a cost of $10,000.

MIAMISBURG, O. — The corner-stone of a Catholic Church will be laid here the first Sunday in May.

MINNEAPOLIS, MINN. — Brackett's Block, owned by G. A. Brackett, which was burned April 7, is to be rebuilt at once.

NEWPORT, R. I. — Mr. Edward Mayer has broken ground for a large cottage on Washington Street.

NORTHFIELD, MINN. — The improvements to be made in rebuilding Carleton College this year will cost $22,000.

OLNEYVILLE, R. I. — Mr. George C. Cady is the architect of the school-house which is to be built at the corner of Amherst and Vaughn Streets; cost, $7,000.

PRESTON HOLLOW, N. Y. — Mr. Warren P. Purrington, Jr., is to build a costly house on Main Street.

PITTSBURGH, PA. — The Property Committee of the Pittsburgh Exhibition have approved plans for the new Power Hall, which is to be built at the west end of the main Exposition Building. The building will be 100 by 168 feet. The architects will receive bids for its construction on the 15th of April; also for a boiler-house, 40 by 80 feet, and an annex to Floral Hall, 30 by 126 feet.

POUGHKEEPSIE, N. Y. — Mr. James Parish is about to build a frame house on the Hudson River; cost, $8,000; A. Cannon, Jr., architect.

Mr. George McLean is building a frame house on Washington Street, costing about $3,000, A. Cannon, Jr., architect.

The Vassar Brother's Laboratory is nearly finished at Vassar College, of brick, with terra-cotta. Silliman & Farnsworth, of New York city are the architects, A. Cannon, Jr., of Poughkeepsie, contractor.

Vassar Brothers are building a Home for Aged Men on the corner of Vassar and Main Streets; size about 50 by 90; four stories, of brick, with granite finish; cost about $25,000; J. Wood, architect, of New York City; A. Cannon, Jr., of Poughkeepsie, N. Y., contractor.

Mr. C. F. Rose is the architect for St. Mary's School Buildings, on Hamilton Street; size, 30 x 42, four stories brick, and blue-stone finish, and costing about $4,000.

Mr. Rose has also just completed the plans for a new city-hall, to contain court-room and all city offices; three stories, brick, and blue-stone finish; 36′ by 50′, fronting on Union Street; cost about $6,000.

RELAY HOUSE, MD. — The corner-stone of what will be known as the Arlington Presbyterian Church, was laid April 8.

RICHMOND, IND. — An effort is making to build a fire-proof museum for Earlham College.

SOUTHAMPTON, N. Y. — Mr. Henry W. Clements is now building houses for W. H. Schieffelin, J. R. Schieffelin, and L. P. Siebert.

TRACY, MINN. — The town has voted $4,000 bonds for a new school-house.

VIROQUA, WIS. — Mr. C. F. Struck, architect of La Crosse, Wis., has just finished plans for the new court-house jail, and sheriff's house, for Vernon County. Cost of all the buildings, $20,000. The court house and jail will be built of stone, the other building of brick. Greenslade & Bailey, of Milwaukee, have the iron contract.

WATERLOO, IO. — The Baptist Church, which is under the care of Mr. F. M. Ellis, of Marshalltown, will cost $12,000.

WEST BROOKFIELD, MASS. — Messrs. G. &. C. Merriman, of Springfield, Mass., are building a Public Library as a gift to this town. The basement is of granite, the upper stories of pressed brick and cut Ohio-stone. Size of building is 58′ x 44′. J. R. Richards, of Boston, architect; James & Marra, Springfield, Mass., contractors for the stone work.

XENIA, O. — A new school-house will be built at once.

ZANESVILLE, O. — The Commisioners will build a new County Infirmary building this summer, to cost $50,000.

Industrial.

APPLETON, WIS. — Bradley, Smith & Co., of Chicago, are to put up a large pulp and paper mill.

Mr. Fleming and Mr. Gilmore are preparing to put up a flax-mill.

BIDDEFORD, ME. — The Pepperell Company is about to build a new mill 125 feet square and three stories high.

BRUNSWICK, ME. — A brick factory, for the Dennison Manufacturing Company, is soon to be built from the designs of Messrs. Kirby & Lewis, architects, of Boston. The building will measure 44′ x 160′, and will be three stories high.

NEW ENGLAND VILLAGE, MASS. — It is reported that the Washington Mills Emery Manufacturing Company, are about to build a new mill, 30′ by 80′, three stories high.

PIQUA, O. — The foundation for Cron's new furniture factory is now being laid.

PROVIDENCE, R. I. — The Brown & Sharp Manufacturing Company is building from the designs of Messrs. Stone & Carpenter, a foundry, 144 feet square.

Public Buildings.

ALTOONA, PA. — The House Committee on Public Buildings and Grounds has agreed to recommend the erection of a public building at a cost of not exceeding $60,000.

CHARLESTOWN, W. VA. — The Senate has passed a bill appropriating $75,000 for a public building in this city.

CLEVELAND, O. — She Senate Committee has decided to recommend the passage of the House bill, appropriating $150,000 to repair and extend the Government public buildings in this city.

HANNIBAL, MO. — The House Committee on Public Buildings and Grounds has agreed to report favorably the bill for the erection of a public building in this city, at a cost not exceeding $75,000.

MARQUETTE, MICH. — An appropriation of $100,000 for a public building has been recommended by the House Committee on Public Buildings and Grounds.

MEMPHIS, TENN. — The contractors for the public buildings have been notified that unless they take immediate steps to complete the work, the Government will revoke the contracts and take possession of the buildings.

PADUCAH, KY. — The Senate Committee on Public Buildings has decided to recommend the passage of the House bills, appropriating $100,000 for the erection of a government building here.

SACRAMENTO, CAL. — The House Committee on Public Buildings and Grounds recommends the appropriation of $100,000 for a public building in this city.

SYRACUSE, N. Y. — An appropriation of $100,000 has been recommended by the House Committee on Public Buildings and Grounds, for a public building here.

Bids and Contracts.

HOLYOKE, MASS. — The contract for finish for the Chemical Paper Co.'s Mill is awarded to the Sutherland Falls Marble Co., of Vermont.

ROCKAWAY, L. I. — Work on the hotel for the Rockaway Beach Improvement Co., is progressing rapidly. The contract for the mason-work calls for the laying of about a million of brick, and has been awarded to Messrs. Robinson & Wallace, of New York.

WEST SPRINGFIELD, MASS. — The contract for marble finish for the Southworth Paper Company's new mills has been awarded to the Sutherland Falls Marble Company, of Sutherland Falls, Vt.

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SPRINGFIELD, Mass., has just completed the second season of its experiment in steam-heating by the Holly system, and the result of so thorough a trial seems to be on the whole satisfactory. The company has now seventy customers, a number large enough to afford a fair test of the advantages or disadvantages of the system. The cost to consumers, which to most persons interested is the important point, is found to be, for the simple heating of rooms by direct radiation, which is all that is yet attempted, somewhat more than that of stove-heat, economically managed, and somewhat less than warming by hot-air furnaces. The tariff which the company proposes to adopt will serve as a means of comparison which every one can apply for himself. It is usually estimated that in heating by direct steam at a pressure of four or five pounds, which is the average tension in the Springfield radiators, one foot of radiating surface will warm eighty to a hundred cubic feet of space. The company intend to fix their minimum charge at fifty cents per square foot of radiating surface for the season, which seems a very equitable arrangement, much more so than the regulation of prices by the number of cubic feet to be warmed, which was at first suggested. On the whole, we do not anticipate a speedy revolution in house-warming from the introduction of this system, unless, at least, it can be economically applied to the heating of the fresh-air supply by means of indirect radiation. While there will always be many who will be glad to be saved the care of domestic fires, a large portion of mankind will be sorry to give up the ventilation and cheerfulness of open fires and good stoves even for the efficiency of a well-conducted steam supply.

MR. CARROLL D. WRIGHT, for some years chief of the Massachusetts Bureau of Labor Statistics, has published some of the conclusions regarding strikes of operatives which have been deduced from the records kept in his office. There is no better authority than Mr. Wright; the figures are there to prove what he asserts, and his statements merit the earnest reflection of those who are interested in the subject. According to him, there have been in the State one hundred and fifty-nine strikes, or struggles between employers and employed, since 1830. Of these, one hundred and ten were unsuccessful, eighteen were successful, six partially so, and sixteen were compromised; the result of the remaining nine is unknown. Thus barely one strike in seven secures a temporary gain for the operatives, rarely sufficient to counterbalance the loss itself causes, while the other six result in total failure. In all cases, the operatives ultimately suffer the whole loss, and these losses are becoming enormous. The Fall River strike of 1879 was simply for money, the operatives — or rather a few spinners — demanding an increase of fifteen per cent in their wages, and compelling the rest to join them. The enforced idleness lasted for fifteen weeks, during which the work-people deprived themselves of fourteen hundred thousand dollars in wages. If they had gained the advance demanded, it would have taken two years for the extra fifteen per cent of wages to make up the losses which their voluntary idleness caused them. That the strike was unsuccessful, only made the matter a little worse for them. Mr. Wright condemns the system in the strongest terms, as demoralizing in its effects upon the individual workmen, and tending directly to lessen the demand for and the price of labor by compelling the manufacturers to substitute machinery for human assistance wherever possible, in order to be free from the senseless dictation of those inflated demagogues who go about "organizing labor," to its own ruin and their private gain. It is well known that emissaries of the English trades-unions, not content with having ruined forever the great industries of their own country, played a prominent part in inciting the poor Fall River people to keep up their worse than hopeless struggle, and Mr. Wright brings against these, or others like them, the terrible charge (but idle, we trust) of having been hired with money by English manufacturers to delude the American operatives into the same destruction which their crafty arts had brought upon their own associates.

ONE hundred and seventy-two companies have made returns to the Insurance Commissioner of the State of New York of their business during the year 1879, and there is now an opportunity of comparing their condition and prospects with those which existed at the end of 1878. The returns for 1878 were sufficiently discouraging, but 1879 shows a state of affairs considerably worse. Taking together all the companies incorporated under the New York laws, and all outside companies having agencies and doing business within the State, it appears that the receipts from premiums increased during the last year, being about 3,300,000 dollars in excess of 1878, this being due both to higher rates and increased valuations. But the losses were greater than in 1878 by six million dollars, or about twenty per cent, so that the net condition of the companies is considerably worse. The cost of maintaining the companies seems also not to have diminished, so that, taking the New York corporations alone, their losses were fifty-seven per cent of their receipts, and their other expenses fifty-four per cent, making a total of one hundred and eleven dollars expenses to every hundred of receipts, the balance of eleven dollars representing a fresh inroad on their capital. The companies from other States doing business in New York make a still worse showing, their average expenditure being one hundred and fifteen dollars for every hundred received. The foreign companies alone were able to transact their affairs at so small a cost for office expenses that their net outlay was four per cent less than their premium receipts, although their losses were heavier than the others, amounting to sixty-three per cent of their receipts. How long the stockholders will be amiable enough to contribute so heavily of their means to help out the policy-holders, it is impossible to say; but if the present ratio of income and expenses is maintained, it is safe to predict that few companies will survive many years. It would be a severe lesson in regard to the really economical construction of buildings, if a general bankruptcy of insurance companies should suddenly throw upon the shoulders of the public not only all the fire losses, but an additional loss of the premiums paid, which amounted last year, in New York alone, to fifty million dollars, and the bulk of the insurance capital besides.

A NEW industry, new at least in that country, has attained considerable proportions in England. Many architects are familiar with the Dutch "cement-tegels," consisting of small tiles made of fine concrete of various colors, some plain, of square, hexagonal, and triangular shapes, like the common plain floor tiles, but smaller, and some impressed with figures which are afterward filled in with a different color, after the manner of encaustic tiles. These are, in Holland, very common and cheap, and it is natural that the extending concrete industry of Great Britain should have taken up the manufacture of similar products. It would seem that some enterprising American companies might profitably imitate the example of their Transatlantic rivals. Our resources, both for cements and coloring substances, are fully equal to those of Holland or England, and the plant required for the enterprise would be comparatively small, smaller than that needed for the cement pipe and artificial stone manufactures. The English can sell their goods at four shillings per square yard and upwards, and the cost of the Dutch tiles is about the same. The cement tiles are very perfect in shape, and are agreeable in texture and color, besides being very easy to lay securely in ordinary cement mortar. If

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they could be produced here for a price as low or lower than abroad, it seems likely that the demand would be large.

The San Francisco *Bulletin* has the honor of having done a thing not itself new, but in this case remarkably well carried out; — the publication of a plan and specification for a cheap dwelling-house. The house is a very cheap one, costing but five hundred dollars; but the ground plan is singularly well-considered, convenient, economical, and free from those strange make-shifts which mark the designs of feeble planners, while the specification is a model of thoroughness. Neither in it nor the plan is anything forgotten or left out, and the specification particularly demands, with the minuteness characteristic of a writer who thoroughly understands his subject, a construction as good as need be desired in a house of far greater pretension. The design was made for the proprietors of the *Bulletin* by a well-known architect, and the sensible view of the matter which led them to seek the advice of a professional man in good standing has been met on his part by an unusual degree of care and success in the solution of a problem which is for most architects neither easy, attractive, nor remunerative. Mr. Pelton has been engaged to furnish other designs for buildings of different character suitable for city and country, and of the same or greater cost, and the series is to appear in the *Bulletin*, one every month. We wish the publishers and their architect the success they deserve, and can assure the profession as well as the public that if the succeeding plans are as good as the first, there will be much in the series which they can study with pleasure as well as profit.

The competition for the Glasgow Municipal Buildings excites much interest in Great Britain. The Glasgow Institute, objecting to the final clause of the circular of invitation, which reserves to the authorities the right to employ either the author of one of the "premiated" designs, or any other person, as the architect of the building, have held a meeting, at which they adopted resolutions requesting the amendment of the terms, so that it should be understood that one or more of the successful competitors would be employed to execute the work; saying, what is undoubtedly true, that although the prizes offered were very liberal, considering the amount of work required (elevation only, for a plan already adopted), the better class of architects would not consent to enter any competition where the reputation and emolument attached to the actual carrying out of his design was not to be the reward of the successful individual. It was supposed that in any case the successful architect would be associated in carrying out his elevations with Mr. Carrick, the city architect, and author of the plans, and to that the Glasgow Institute saw no objection. Some criticisms were made at the meeting upon Mr. Carrick's plans, but it was thought best to make no mention of them in the communication to the city authorities.

This method, very commonly adopted in municipal competitions, of having plans prepared beforehand by an official architect, under the supervision of the city officers and others who will have to use the proposed building, and may therefore be supposed both to have the most interest in the planning of the new structure, and to know best about what the business of their several departments requires in the way of space, arrangement and light, has some objections in an artistic point of view. Even with the most skilful planning, the distributing of rooms without any special care for the elevations would be a proceeding little calculated to insure a pleasing exterior, especially in a "dignified classic" style, while the actual process of endeavoring to meet the wishes of a number of officials would be likely to degenerate into the mere aggregation of rooms, a process as far removed from planning, properly so called, as the result in elevation would be from any pretense of classic elegance. Even where the competing architects are not required to adhere to the plan prepared for their guidance, most of them are very likely, however sensible of its defects, and competent to improve upon it, to be astute enough to perceive that their interest will be best promoted by adhering to it pretty closely. In that way they will not only be sure of pleasing the municipal officials, who, seeing their own familiar arrangement adopted, will cast their suffrages for it in preference to a strange plan, which they would conceive a natural prejudice against even if they were willing to undergo the labor necessary for comprehending it, but they will secure the advocacy of the city architect, who will be gratified at seeing his own design endorsed, it may be by some very eminent professional brother, and whose opinion is sure to have great weight with the councilmen, assessors, and the other burgher authorities. A better mode is perhaps to give the number of rooms required on each floor, with the desired area of each. This gives more liberty to architects, and practically secures the advantage of holding them all to an arrangement accepted as the best by those most interested, without insuring the adoption of perhaps a very ill-considered form of that arrangement. The only precaution necessary to be observed is to see that sufficient thought is given to the list of requirements, so that the aggregate area of the second-story rooms shall not, as in one case we recollect, be almost double that of those permitted to occupy the first.

The Balmain luminous paint, to which we lately referred, seems to be preparing for a descent upon the industrial world something like that of the telephone. The substance is a combination of lime and sulphur, not exactly a calcium sulphide, but containing a certain proportion of oxygen. The luminous properties of some compounds of this class have long been known, but the late Mr. Balmain succeeded in greatly increasing them, and facilitating their application. The paint is not in itself phosphorescent, but on being exposed to light absorbs, as it were, a certain quantity, which it radiates again when the original source of light is removed. It has been tried on railways, by painting the ceilings of the cars with it, and it is proposed to use it on the masts and spars of vessels, which would thus be protected from collision by being visible over their whole extent at night. Direction posts on roads may be painted with it, and it is said that the coating of fences and railings will give light enough to direct carriages and enable them to avoid running into other vehicles, or obstructions in their path. The action of the paint does not seem to be an oxidation, attended with fumes like those of phosphorus, but is said to be rather a fluorescent condition, through which the more refrangible rays of the spectrum, ordinarily invisible, are in some way retarded and rendered visible. This explanation does not seem quite clear, as it is not generally understood that any *solar* rays, however refrangible, strike the side of the earth which is turned away from them at night, but the main point, that there is no chemical change involved, is a matter of considerable importance.

The railroads are undergoing a season of criticism, both in New York and Massachusetts, which seems likely to take form in legislation to regulate tariffs; not in the wild style of some previous attempts, but rather for the purpose of restricting the favoritism and discrimination, for one reason or another, to the advantage of certain firms or individuals, which, under the name of "special rates," "rebates," "secret contracts," and the like, has, justly or unjustly, done great injury to those who were not included in the advantageous terms. Perhaps, as the injured ones assert, those who control these enormous highways see no harm in using their power recklessly for their own selfish ends or for the enrichment of their personal friends; perhaps, as the railroads say, it is only the universal principle of business to give extra inducements to large customers, and that they are bound to offer such inducements if thereby their stockholders will be benefited. It would be harsh to accuse any one of actual wrong: at best, the notion that railways built by private capital had any responsibility to the public is of recent growth in this country, and it is fair to say that on the whole the roads have, of their own accord, treated the public well, so that whatever legislation is necessary should be decided upon with the utmost care and consideration. The investigations bring out some singular facts, which may be due as much to confusion in the minds of traffic agents as anything. For instance, it is in evidence that large manufacturers in Rochester, New York, find it considerably cheaper to send their goods to New York, and re-ship them thence to St. Louis and Cincinnati *viâ* Rochester, than to ship direct from home, thus paying for some three hundred useless miles of transportation; and there are scores of similar cases, while the preferences given to the Standard Oil Company by the great trunk lines, allowing that corporation rates for freight less than half those charged the other companies, are said to have injured the trade of its competitors to such an extent that there is now no refinery in New York State which the Standard Company does not own.

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VENTILATION OF BUILDINGS.[1] — II.

The influence of the vapor of water on air for respiration is a very important subject. The following table shows the capacity of air or vapor, and the tension of the vapor in inches of mercury at different temperatures.

Temp. Fah.	Tension of vapor in inches of mercury.	Weight in grains per cubic foot.			Volume of 1,000 cubic feet of dry air after its saturation.
		Vapor.	Saturated air.	Dry air.	
0°	.044		606.03	606.37	
5°	.054		599.40	599.83	
10°	.068	0.84	592.94	593.44	1002.3
15°	.086		586.55	587.18	
20°	.108	1.30	580.26	581.05	1003.6
25°	.135		574.08	575.05	
30°	.167	1.97	567.99	569.17	1005.6
35°	.204	2.48	561.99	563.42	
40°	.247	2.86	556.03	557.77	1008.3
45°	.299	3.44	550.19	552.24	
50°	.361	4.10	544.36	546.82	1012.0
55°	.433	4.87	538.60	541.50	
60°	.518	5.77	532.84	536.28	1017.3
65°	.617	6.81	527.14	531.17	
70°	.733	8.01	521.41	526.15	1024.4
75°	.868	9.39	515.60	521.22	
80°	1.023	10.98	509.97	516.39	1034.1
85°	1.203	12.78	504.19	511.65	
90°	1.410	14.85	498.43	506.99	1047.0
95°	1.646	17.18	492.56	502.41	

It will be seen, by the inspection of this table, that the quantity of vapor per cubic foot is nearly doubled with every 20° of additional temperature. So that if we take air that is saturated, at any given temperature, and heat it to a temperature 20° higher, we find it only 50% saturated.

Let us now look at the actual loss of heat by evaporation.

Air (as on the sea-coast) at 60° Fahrenheit, and 80% saturated, contains 4.62 grains of water per cubic foot. Air (as in Arizona) at 70° Fahrenheit, and 40% saturated, contains 3.2 grains per cubic foot. The latter, though 10° warmer, as indicated by the thermometer, *feels cooler;* because more than four times as much heat is lost by evaporation from the lungs, as in the former case, besides the excess of heat carried off by the skin. This is susceptible of actual proof as follows: —

The specific heat of air being 0.237 (nearly), and the air weighing about 536 grains in the first case, and 526 in the second case, as per above table; there being 7,000 grains in a pound, and 966 heat units being absorbed by evaporating a pound of water, the exhaled air at 90°, and saturated, then:

In breathing air at a temperature of 60°, with a humidity of 80%, the heat absorbed from the lungs is as follows, for one cubic foot:

Absorbed by heating the air: —

$$30° \times \tfrac{536}{7{,}000} \times 0.237 = 0.544 \text{ heat units;}$$

Absorbed by evaporation: —

Air at 60°, and 80%, saturated, contains of vapor	4.616 grains.
Air at 90°, and 100% " " "	14.850 grains.
Supplied and taken up from the lungs . .	10.234 grains.

Now $\tfrac{10.234}{7{,}000} \times 966. = 1.412$ heat units.

Total, $1.412 + 0.544 = 1.956$ heat units.

If air is at 70°, and 40% humidity: —

Absorbed by heating the air,

$$20° \times \tfrac{536}{7{,}000} \times .237 = 0.356 \text{ heat units.}$$

Absorbed by evaporation: —

Air at 70°, and 40%, saturated, contains of vapor	3.20 grains.
Air at 90°, and 100% " " "	14.85 grains.
So the quantity taken up from the lungs is .	11.65 grains.

Now

$$\tfrac{11.65}{7{,}000} \times 966 = 1.608 \text{ units;}$$

Total, $1.608 + 0.356 = 1.964$ units; or more heat than in the first case supplied by the lungs.

Now what amount of the vapor of water is compatible with the greatest degree of comfort and health?

Very vague notions prevail on this subject. We hear on one hand a general distrust of *dampness*. Air that is nearly saturated with vapor is almost universally condemned in theory, whatever be its temperature. If it be lower than 40° or 45° Fahrenheit, it feels chilly and "raw," as we call it. It carries off the bodily heat rapidly by conduction or convection from exposed parts of the body; though, as we have just seen, the lungs may not lose so much heat as by saturating a dryer air. Moreover, there are many humid climates, like that of Ireland, which are by no means unwholesome. Any circumstances which occur in such a damp climate, that tend to increase the dampness in *dwellings*, must, however, be much more carefully guarded against than here, where the natural condition of the air is relatively dryer, and such excess is readily absorbed.

We hear, also, a good deal about the need of supplying vapor to the air that is heated for warming our dwellings by closed stoves or steam-pipes, and various devices are now in general use for that purpose.

In severe winter weather, the air-supply for a furnace may be at 0° Fahrenheit, and therefore contain but 0.55 grains of vapor per cubic foot. This air is heated up to 100° or 150° perhaps, — though 100° is hot enough, — and after mixing with the air in the room we occupy, the whole is kept at about 70°. If no vapor be supplied, the 0.55 grains first found would be a very scanty supply for air at 70°, which can only be saturated by some fifteen times as much, or eight grains per cubic foot.

But even without artificial supply this air would probably not remain in this condition. All surfaces with which it comes in contact yield more or less vapor, especially if the room be occupied. But let us suppose that by some artificial means this air at 70° has been supplied with vapor enough to bring it to a humidity of 70%. This is about the state of "summer air" in this climate, when abundantly supplied with moisture by expanses of water or recent rains on the soil. Such is commonly supposed to be the desired state of things; but even if it were possible to maintain it in our heated rooms at this season, the result would not be so comfortable as we might at first suppose.

The difficulty of keeping the moisture consists in its considerable tension above the condition of things out of doors, so the vapor would escape through various cracks into the outer air by *diffusion;* also, that wherever coming in contact with window-glass or outside walls of our buildings, the cooling influence of these surfaces would instantly chill the air below the dew-point, and the vapor would stream down the glass, as we often see it do in a crowded hall under such circumstances. The discomfort or insalubrity of such a condition arises partly from the great contrast between such air and that out of doors, to which we may be alternately exposed; but chiefly to the tendency of the organic impurities to decompose rapidly when in contact with vapor of water at high temperatures. They thus become offensive as well as injurious by their putrid state, which might be in large degree avoided in a dryer air. Suppose a man to spend an hour walking or driving about the streets in a temperature of 0°. The respiration goes on actively, for a feeling of exhilaration always follows such exposure, if in health. The consequence is, as we have seen, that the air exhaled has not only to be heated some 80° or 90°, but supplied with water by evaporation to an extent that absorbs many times as much heat from the lungs as by heating the air; yet no disagreeable effect is produced. If sufficient clothing is provided to keep the skin warm, the loss of heat *there* is not great, for no sensible perspiration occurs under such temperatures without violent exertion. The air that is inhaled and heated 80° by the lungs is thereby rendered just as absorbent of moisture as if heated by contact with a stove, till the moist membranes of the lungs supply the water to it. The climate of high table-lands, such as exists in Siberia, and Arizona, is considered and in fact actually *found* to be very conducive to health; yet but very little vapor is found in the air in those places. The air is so dry that fresh meat dries up instead of putrefying in the open air, and certain tribes of Indians living in those elevated regions do not bury their dead, but dry their bodies on platforms, as we are told by Catlin.

I find the following quoted by Mr. Robert Briggs, from the report of Dr. J. S. Billings, on the Hygiene of the United States Army in 1875.

Descriptions of military posts, Fort Yuma, California. "During the months of April, May and June, no rains falls. Then, with the thermometer at 105°, the perspiration is scarcely seen on the skin, and it becomes dry and hard, and the hair crispy, and the furniture falls to pieces; ink dries so rapidly upon the pen that it requires washing off every few minutes; a No. 2 Faber's pencil leaves no more trace on paper than a piece of anthracite, and it is necessary to keep one immersed in water while using another that has been standing in water some time. Newspapers require to be handled with care; if rudely handled, they break. 12-lb. boxes of soap, when re-weighed, gave but 10 lbs. Hams lost 12%, and rice 2%, of their original weight. Eggs that had been on hand for a few weeks lose their watery contents by evaporation; the remainder is tough and hard: this has probably led to the story that our hens lay hard-boiled eggs.

"This post, though not the most southerly, is the hottest military post in the United States. A temperature of 100° at Fort Yuma may exist for weeks in succession, and there will be no additional cases of sickness in consequence. We have none of the malarial diseases. The average rain-fall during four years was a little over two inches each year."

The influence of a dry climate as a preventive or cure for lung diseases is fully set forth in the report of the Massachusetts Board of Health, by Dr. H. I. Bowditch, who seems to have established it beyond dispute. Actual observation confirms the impression that no bad result follows the breathing air in hospital wards as dry as that of Arizona. Dr. Cowles, of the Boston City Hospital, says there is no discomfort arising from a humidity limited to 15% to 21% in his wards.

[1] A lecture by Mr. Edward S. Philbrick, C.E., delivered before the students of the Massachusetts Institute of Technology.

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The small amount of humidity in our climate as compared with that of England is given by Mr. Robert Briggs, as a reason why a higher temperature within doors is needed here for comfort than in damper climates. The Englishman expresses surprise at the heat of our houses. A temperature of 70° to 75° appears excessive to a man who is accustomed to live in one of 55° to 60°. But the difference in humidity is a sufficient cause. If our air contained the same quota of moisture that the air of England does, we should not need the high temperature. It is the dryness of our air that absorbs heat by forcing evaporation, as has been explained, so that the system loses as much heat in our dry rooms heated to 75°, as in an Englishman's parlor at 65° with its moderate evaporation. If the damp air of England were heated to the high temperature to which we are accustomed, it would be extremely uncomfortable, if not unendurable. Dr. De Chaumont has stated (Proceedings of Royal Society, V. N., 1877, p. 495), that the amount of CO_2 in air when vitiated to certain degrees perceptible to the senses was found to be as follows: First, fresh air, 1.1943%; second, rather close, .4132%; third, close, .6708%; fourth, extremely close, .9054%. He therefore adopted 2 in 10,000 as the limit of respiratory impurity in an air-space well ventilated, being the same standard as adopted by Parkes. Dr. De Chaumont also estimated that an increase of 1% of humidity has as much influence on the condition of an air-space, as judged of by the sense of smell, as a rise of temperature of 4.18° Fahrenheit. For this reason extreme heat in England, when it occurs, is much more oppressive than in dryer climates. The surrounding ocean nearly saturates the air with moisture at all seasons. When the temperature is above 70° or 80°, comfort requires that the heat of the body be reduced, to which end a dry air that evaporates the perspiration conduces most rapidly. Hence the most uncomfortable weather we have in our own summers occurs when extreme heat is accompanied by the south-west trade-wind, that comes laden with vapor from the tropical seas, and incapable of absorbing more. We call it "dog-day weather," and it is associated with a feeling of suffocation, arising from the plethora of vapor, and the inability of such air to cool the accumulated animal heat by evaporation of perspiration on the skin. The least exertion covers us with moisture, though the temperature may be several degrees lower than on other days when a dry north-wester carries off the moisture as fast as it comes through the skin, with the corresponding cooling effect. In short, the damp air when above 60°, always feels hotter than the thermometer shows it to be, while the dry air often feels cooler than it is.

When below 50°, an air nearly saturated with watery vapor becomes disagreeably chilly, not by promoting evaporation, but by the capacity for heat existing in the water; the specific heat of watery vapor being over twice that of air, and the loss occurring by convection through contact with the skin. This effect is therefore partly checked by warm clothing, till the clothing itself becomes dampened, when its effect is rather worse than that of the damp air.

Every one knows the danger of wearing wet clothing. Mrs. Brassey says (Voyage in the Yacht Sunbeam), the rains are so frequent in Polynesia that the natives are said to be much more troubled by pulmonary diseases since their civilized habits have taught them to wear clothes, because they have not learned the importance of keeping them dry. When naked, the skin dried quickly after a shower, while now they wear wet clothing till it becomes dry, a much longer process, demanding a large supply of heat from within to carry on the evaporation.

Although it is not desirable to provide for the saturation of the air in our houses in winter to a standard near to that of summer air, and although a comparatively dry air is not found unwholesome, the addition of a small quantity of water, such as is now generally done in most of our house furnaces, is for some reason or other apparently necessary, both for comfort and the preservation of ordinary wood-furniture, which tumbles in pieces in a very troublesome way if kept in an air with less than 10% or 15% of humidity. In a paper read before the American Institute of Architects by Mr. Robert Briggs, he discusses this question very clearly and fully. He speaks of the discomfort arising from rooms heated without any artificial supply of water, and attributes it to the lack of humidity simply. But Dr. John S. Billings attributes the discomfort to a lack of fresh air, or a temperature in the air that is supplied that is too high for comfort, if enough be admitted to keep the quality good. The exposure of water and its consequent rapid evaporation absorbs this surplus heat, and allows the proper amount of fresh air to be admitted without the sense of over-heating. If it be argued that the dry air, even at the higher temperature, would call for an amount of evaporation in the lungs to cancel the surplus heat, the answer would be that the presence of any considerable number of inmates would tend itself to over-heat the room. Thus, when we come to consider large halls for the accommodation of hundreds of people, artificial evaporation is unnecessary, for the lungs of the inmates supply more vapor of water than is actually needed, and it becomes an evil. The heating of theatres and large halls, court-rooms, etc., together with a proper amount of ventilation, is a very difficult problem. We have two very different conditions to provide for; first, the heating of the vacant hall to a degree consistent with comfort, say 60°, which is simple enough; second, the maintenance of this or any other comfortable temperature after the hall is filled with people, which is far more difficult. We have then to supply fresh air for breathing, and diffuse it over the space without disagreeable draughts, at the rate of some 30 or 40 cubic feet per minute for every person in the hall, and carry off the same quantity of vitiated air. We have also to take into account the heating capacity of the inmates, rather an indefinite quantity, concerning which no reliable data can be had, and which we must estimate as best we may. The amount of heat imparted by the human body to the surrounding medium must vary largely with the state of activity, vigor of the circulation, and the difference of temperature between the body (standard, 98°) and that of the surrounding medium. Comfort requires a constant escape of heat, so we may suppose the surrounding medium to be cooler than the body, *i. e.*, that the conditions are such as we wish in order to produce comfort. It has been variously estimated under such condition, that an adult gives out from 150 to 470 heat units per hour: the greater amount is about the same as that produced by the burning of a sperm candle. But if we take a moderate estimate, say 200 heat units per hour, for people at rest in a comfortable room, we shall have for the number of cubic feet of air thus heated 1° per minute for each adult, $\frac{200}{60 \times .238 \times .0768} = 1{,}818$ cubic feet of air heated from 60° to 61° in one minute by an adult.

The capacity for emitting watery vapor from the lungs is, as above stated, sufficient to relieve us from any need of an artificial supply of vapor. The excess is rapidly diffused and carried upward with the vitiated air. This vapor has the convenient quality of seizing upon and carrying with it many noxious organic vapors and dusts which we can thus get rid of. The failure to get rid of this, in fact, is the most frequent cause of trouble. Another complication is met with here. These organic vapors arising from the exhalations of an assembled audience are mostly in a putrescent condition to begin with. The loading of the air with vapor of water tends to hasten this decomposition, so that after being heated, steamed, and sent upward by their buoyancy, mingled perhaps, in the upper gallery of a theatre, with the products of several hundred gas-burners, each emitting as much heat, watery vapor, and CO_2, and consuming as much oxygen, as half a dozen men at least, we have a state of things sufficiently repulsive to make the strongest man succumb.

The power of dry air to delay the putrefaction of solids has been before alluded to, in connection with the drying of meats in Arizona; but here we have the reverse of all those conditions: plenty of heat, plenty of vapor, and the organic impurities, already corrupt when given off, and in that gaseous or finely divided condition which is most conducive to rapid decomposition. The only wonder seems to be that we ever are able to spend half an hour in such an atmosphere without seriously impairing our health. That we do not, is only a proof of the native vigor which resists such influences.

It is a case of almost daily, or at least nightly, occurrence, to find such halls provided with the same influx of heated air, hour after hour, with the seats all filled, that was provided *before* the people came there. The degree of *heat* found necessary to bring the vacant hall up to 60°, and keep it so, is largely in excess when a thousand people are breathing in it, while the *quantity* of air coming in is rarely enough. In short, we want not only a much less supply of heat to produce a given temperature in a filled hall, than in an empty one; but we want to keep the actual temperature lower when filled than at first, owing to the increase of humidity. To accomplish this with success, and at the same time furnish the required *supply of air*, is the thing which is rarely done. Of course it requires a degree of intelligent supervision to regulate the heat of the fresh air, while keeping up the supply in volume. Regard must also be had to the condition of the air outside. A change of 10° or 15° in the outside temperature during two hours, affects the case not only by loss of heat through the walls, windows, doors, etc., but by requiring so much more heat applied to the fresh air that is introduced, in order to produce the same effect, *i. e.*, bring it to the desired temperature when admitted to the room.

I have thus far tried to describe the *amount of work* to be done in changing the air inside of buildings. I shall, in the next lecture, try to show *how* this work can best be done.

PORTLAND CEMENT. — III.

In the discussion which followed the reading of Mr. Faija's paper,[1] Professor Alex. B. W. Kennedy, M. Inst. C. E., said: The subject of this paper is of quite as much interest to engineers as to architects, and of quite as much importance. The author's method of treating it has, however, kept him from mentioning many points of considerable importance which ought to be looked at, for some of them are too often neglected. I should like, in the first place, to say a word or two about some of the points which he has mentioned. On page 113, he gives experiments as to the non-cementing of material which passes through very small meshes, which I must say took me by surprise, as I dare say they would many who have not tried them. I had the curiosity to test the question for myself, and with a result which exactly tallied with his. I took a couple of pounds of a fairly quick-setting cement of which 17 per cent passed through a No. 50 mesh (2,500 to the square inch), while 71 per cent passed through a No. 70 mesh (4,900 to the square inch), and the remaining 12 per cent I made into a cake. At the expiration of 44 hours it had not set in the least. I find that Bauschinger has experimented upon this also. He took cement which, as delivered, had a tenacity of 398 lbs.

[1] A paper by Mr. Henry Faija, Associate M. Inst. C. E., read before the Royal Institute of British Architects, February 3, 1880.

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per square inch after four weeks. The part of this cement which went through a 5,800 mesh had a tenacity somewhat less at the same time. That, however, which was left behind had at best a tenacity only about one-fifth of its original strength, and in some cases would not set at all. There is a matter on page 115, which I am sorry to say I am not able to see in the same light as Mr. Faija. He says that as we express loads in pounds per square inch, it would seem natural that the briquettes should have one square inch of area. If this were any valid reason whatever, then on the Continent briquettes should have an area of a square centimetre, which of course no one would think of proposing. The question of reducing one area to another is merely an arithmetical one, and the proper area must be decided on quite other grounds than that suggested by the author. I confess my own leaning is rather to larger briquettes, for the reason that, so far as I know from my own experience and from the experiments of other people, the smaller a briquette is, the more does its resistance depend on the skill of the man who gauges it, and the less does the result obtained from it have any direct bearing on the practical value of the cement tested. The large briquette will of course give in general a much smaller result than the small one, but a result which is much more independent of specially skilled manipulation, and of much greater practical value. I, myself, am using a briquette of standard area (2¼ square inches) of a form designed by my friend Mr. R. H. Willis, with the special object of getting the line of pull exactly in the axis of the briquette. It has conical ends with flattened sides, and gives very good results. Bauschinger, who probably has made more experimental determinations on this subject than any other man, uses simply a rectangular block of 2⅜ inches by 4¾ (72 square centimetres), and grips it between wedges; his cross-section is thus 11 square inches. Indeed, I am disappointed that Mr. Faija has not said anything about the experiments which were completed about twelve months ago by Professor Bauschinger (of Munich), which contain somewhere about 15,000 separate determinations (summarized by the author), including all the points on which Mr. Faija has given results, and a great many more. He has tested neat cement after one, four, eight, twelve, sixteen and 120 weeks, cement mixed with sand in various ratios, cement old and fresh, large and small briquettes, and briquettes moulded in different ways, shearing strength, crushing strength and bending resistance, as well as tensile strength, specific gravity, chemical constitution, absorption of water, increase in volume in drying, and many other matters. I know of no more complete monograph on any subject, and it would have been of much interest if the author had given us some summary of the results. It is customary, for some reason or other, to test cement only in tension. I do not know why, for we certainly take care not to utilize its resistance to tension at all; we subject it either to crushing or to shearing. There is no difficulty about testing cement in compression, for cubes will break by crushing as fairly as any briquettes, and their breaking point is quite as determinate. It is often assumed that the compressive resistance bears some constant ratio (often 10 times) to the tensile strength. This, however, is a mistake. The ratio varies from 7 to 13, and the mere tenacity of a cement is no guide to its compressive resistance. I may give you three sets of experiments that I have made myself recently on 1½-inch cubes cut from ordinary briquettes. With a slow-setting cement, having a tenacity of 490 lbs., the crushing resistance was 5,200 lbs., or nearly 11 to 1. With a quick-setting cement of 522 lbs. tenacity, the crushing resistance was 4,510 lbs. per square inch, or 8.64 to 1; while a third cement of medium quality gave the figures 326 and 2,620 lbs. per square inch respectively, or 8 to 1. The resistance to crushing increases with time more quickly than the tenacity, that is to say, a ratio 8 : 1 after one week, becomes in sixteen weeks 10 : 1 in the average of a great many of Bauschinger's experiments. The crushing resistance of flat plates is of course much greater than that of cubes, but the exact point of destruction is not so easily determined. With the shearing resistance I have not myself made any experiments, but I find that the average of a very large number of Bauschinger's which I have examined is that the shearing resistance of cement varies little from being 25 per cent greater than its tenacity. It is singularly uniform, and it increases with time as the tenacity increases. My colleague, Professor Lewis, has asked me if I could say anything as to the elasticity of cement; but I had not experimented on this point, and have only had time just to look at it. I planed down an unbroken briquette into a prism 6½ inches long and 1½ inches square; I put that in my testing-machine and *bent* it. To measure the deflections, Mr. Willis schemed a simple telescopic apparatus, and the deflections I got were: with a load of 50 lbs. (applied at two points four inches apart), 0.0025 of an inch; with 100 lbs., .0066; with 150 lbs., .01 inch; and at 175 lbs. the piece broke. I merely mention this experiment as a matter of curiosity, and to show that cement *will* bend, although the deflection is so very small. The maximum tensile stress which cement will stand in the form of a beam before it breaks, calculated in the usual fashion, Bauschinger appears to make somewhere about three times the direct tenacity. That I have been unable to verify myself, but I have no reason to doubt his correctness. The question of the way in which a cement shall be allowed to set before testing is of some importance. On the Continent they seem to be more fond of drying in the air than we are. No doubt, as a rule, cement which has been in water for a long time has a tenacity higher than that which has been in air only, but I do not find that the crushing resistance is affected in the same way. When, however, the cement is not neat, but mixed with sand, it does not appear to make any difference whether it is dried in air or under water. Another point which has been several times mentioned in connection with the testing of cement is the question of moulding under pressure. One uses the cement under pressure, of course, so this appears a point of some practical interest. I moulded some briquettes last week specially to try this point. I put 300 lbs. on each briquette, which corresponded to a pressure of about 20 lbs. per square inch, and their average tenacity was 505 lbs. per square inch (the minimum being 454 lbs. and the maximum 555 lbs.), while the mean of 13 ordinary briquettes of the same sample was only 273 lbs. per square inch (the minimum 240 lbs., the maximum 340 lbs.). The tenacity was increased 1.85 times, although the new briquettes had only been under water 4½ days and the other 7 days. The question whether cement is injured by being kept in bulk has often been discussed. Bauschinger has examined this point also, and having tested some 1,500 to 1,700 briquettes made from cement which he had stored from 3 to 3½ months in a dry place before moulding, the results were somewhat less regular than with briquettes made from fresh cement, but the average strength was nearly the same. And now, lastly, as to the general question raised by Mr. Faija's specification. I fear that, unless you are much fonder than we engineers are of very elaborate specifications, such intricate clauses can never be of any use, and that even if they were inserted they could never be adhered to. I would, however, make a suggestion. It being unquestionably of importance that cement should be properly tested, and equally true that if it be not tested in a uniform fashion the results will have comparatively little value, it might be possible for the Council of the Royal Institute of British Architects, in conjunction possibly with the Council of the Institution of Civil Engineers, to agree upon some standard method of testing cement. Then it would be an easy thing to put in a specification that the cement was to be tested according to an acknowledged standard, and would save all such long and minutely particular clauses as those suggested by the author, which, moreover, might and would be altered by different people in one and another detail until the whole affair became hopelessly confused. If this were done I would make two further suggestions: first, that the size of the briquette should be rather increased than diminished, and, secondly, that the compressive resistance ought to be made a part of the test, if, indeed, it should not altogether replace the test for tensile strength.

Professor Kerr, *Fellow.*— I have listened with very great pleasure to what has been said by Professor Kennedy, and I must say with a little more interest than that which I found in the paper itself, for it struck me that the learned lecturer has imparted very little information that would practically apply to the use of Portland cement by ordinary builders. As for introducing in our practice such a test as he speaks of — that is perfectly out of the question; and if, under the new Act of Parliament, the district surveyors, of whom I see a distinguished leader present, are to apply such a test as that to every sack of cement brought on a building, I do not know where it is to end. What Professor Kennedy suggests as a simple test strikes me as being exceedingly serviceable. I thought, while the paper was being read, that the tensile strain was one which it seemed difficult to proceed upon, and that the compressive test would serve our purpose a great deal better. It seemed to me that the test might be reduced to some such form as this: that a certain weight of cement, no matter what cement, might be mixed with a regulated quantity of water, and placed after a time (without any of this ceremonial about being so many days under water), when thoroughly set and dry, under some simple crushing process. Then it seems to me that it would be the easiest thing in the world to determine whether it was fit for our use or not. We do not care whether it is coarse or fine, all we care about is the effective strength; and it seems to me that the compressive test would determine that, and also that it might be determined with the least possible trouble. All this information about the German researches is very interesting, no doubt, to those who may have years to spend upon it; but as we architects use cement, something very much simpler must be put before us. I was glad to find the author at the end of his discourse mentioning that with cement, as with everything else of the kind, the less the quantity of water, the better the result. The reason is plain: the water has to be evaporated out in course of time, and that which is so evaporated must necessarily leave a vacuum behind (filled with air, of course); therefore, in plain language, the more water there is put in, the more water there is to evaporate out, and the more porous is the cement. We thus come back to the process of M. Coignet, which must have made an impression upon the minds of many persons present: that, with perfect manipulation and perfect materials, the smallest quantity of water always produces the best mortar — or the best artificial stone in his case. Gentlemen are no doubt aware that the quantity of water M. Coignet uses in his bêton is so extremely small as to be almost incapable of being discovered in the powder which is ready by pressure or gentle percussion to be converted into the artificial stone. On the whole, the information conveyed to us by Mr. Faija and Professor Kennedy is extremely useful, and I hope we shall hear the opinions of others upon the subject. One will think of what another will not, and, seeing that cement is coming more and more into use, it is extremely important that we should thoroughly understand its qualities. There is one respect in which cement is being extensively introduced, which I think requires to be considered by architects, and it has not been mentioned to-night. I refer to fire-proof floors. We find iron joists placed at certain inter-

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vals, and cement slabs, whether flat slabs or so-called arched slabs; and it seems desirable that we should understand the exact behavior that is to be expected from such slabs.

Herr Gustav Grawitz. — I quite agree with the greater part of Mr. Faija's able paper, for its contents generally correspond with the results of numerous experiments made in Germany with German Portland cement. I desire, however, to make a few remarks in order to draw comparisons between English tests and German tests, and to submit suggestions which may be of some use. As Portland cements are never used neat, but always mixed with sand in mortar or concrete, the Germans have substituted the tests with briquettes made of neat cement for those with briquettes made of mixtures of cement and sand. I am surprised to hear Mr. Faija state that tests made by the Metropolitan Board of Works are still carried on with briquettes of neat cement; for a new specification, in accordance with the German system, was introduced by the Board last October. The cement is now gauged with three times its weight of dry sand, which has passed through a sieve of 400 and been retained upon one of 900 meshes to the square inch, by which process the coarser and finer particles are eliminated. All the briquettes have to bear a tensile strain of 140 lbs. per square inch after having been forty-eight hours in air and twenty-six days in water. The German rules require a tensile strength of ten kilogrammes per square centimetre, or 142.2 lbs. per square inch; and the standard sand used in Germany is clean and dry quartz sand which has passed through a sieve of sixty meshes per square centimetre (387 meshes per square inch) and been retained upon one of 120 meshes per square centimetre (774 meshes per square inch). At the Metropolitan Board of Works the briquettes are kept two days in air and twenty-six days in water, whilst in Germany they are kept one day in air and twenty-seven days in water. I quite agree with Mr. Faija, that the briquettes should be broken directly on being taken out of the water in order to secure uniform results, for it has been proved that they lose in strength if afterwards kept in air during a lengthened period. I cannot, however, agree with his statement that all Portland cements before using should be properly seasoned or cooled; for it is well known in Germany that a very good brand of slow-setting Portland cement can, at any time, be safely used direct from the mill. In fact, a slow-setting Portland cement cannot be considered a good one if it require seasoning, but it is different in the case of quick-setting cements, from which great strength and reliability cannot be expected. With regard to the degree of fineness of cement as specified by Mr. Faija, namely, "no residue on a sieve of 625 meshes per square inch," I do not object to that. German Portland cements are often so finely ground now that, if passed through a sieve having 180 meshes per square centimetre, or 1,161 meshes per square inch, they leave not over 0.2 per cent of residue. Mr. Faija proposes that not over 15 per cent of residue should remain on a sieve of 2,500 meshes per square inch; this is decidedly too much, for finely-ground German Portland cements do not leave more than two per cent of residue on such a sieve. The last specification of the Metropolitan Board of Works requires that 80 per cent of the cement shall pass through a sieve of 5,800 meshes to the square inch, about the same degree of fineness as prescribed by the German official rules, still there are German manufacturers whose produce never leaves more than half this amount of residue, or about 10 per cent, on such a sieve, and sometimes even much less. The weight per striked bushel is specified by Mr. Faija to be not over 116 lbs. and not under 108 lbs. Now, although it is quite true that the weight, unless taken in conjunction with the fineness to which cement is ground, is absolutely valueless as a guide to the quality, and that therefore the two should always be taken in combination, it appears to me that the mode proposed by Mr. Faija is too complicated for ordinary practical purposes. Finely-ground and strong German Portland cements never weigh more than from 110 lbs. to 112 lbs. per striked bushel; and as already stated some time ago by Mr. Bramwell, and corroborated by Mr. Grant's valuable experiments, the test for heavy weight is merely a premium for bad grinding calculated to mislead, for badly-ground cement means inferior cement. As already proposed by Professor Kennedy, a uniform method of valuation is a matter of great importance for both manufacturers and users of Portland cement. The German system of official rules works admirably, and it is a pity that independent public testing rooms under Government control, such for instance as the Testing Department for Building Materials at the Royal Industrial Academy in Berlin, are not yet established in England. However reliable and trustworthy a private Portland cement tester may be, sellers and buyers very frequently disagree as to employing for this purpose the same person, and thus difficulties arise. The best reputed German Portland cement manufacturers guarantee their produce to have certain degrees of tensile strength if tested according to the official German rules. This is of great importance, enabling users to rely with confidence on the quality of a cement, whilst the security which such reliance must engender adds greatly to the consumption of Portland cement. A drawback still in existence is that those manufacturers who give themselves the utmost trouble, and do not shrink from extra expense in order to produce a thoroughly good Portland cement, much stronger than is generally specified, cannot in many instances obtain a higher price than those who supply a commodity worth much less in reality, and which merely comes up to the requirements of the specification. This is no inducement for manufacturers to improve their produce. Portland cement, therefore, provided it stands the preliminary tests for fineness, weight, expansion and contraction, should be valued, like every other merchandise, according to its quality, namely, tensile strength, as for instance in the case of alcohols, where the overproof is paid for. A cement at 50*s.* per ton may be much cheaper than another cement at 40*s.* per ton; this depends entirely on the quality, namely, the quantity of sand with which each cement can be safely mixed. Architects and engineers have every interest to use only the very best materials. Many consumers of Portland cement have no idea of the enormous waste which always takes place when weak cements are used; besides, it is obvious that if 300 tons of one cement can safely do the work of 500 tons of another cement, the preference ought to be given to the former, and a deal of superfluous expense saved on cartage and freight. I venture to submit that the establishment, in England, of a public testing department for the building-materials under Government control would be in the interest both of producers and users of Portland cement, and that official rules for a uniform method of valuation of Portland cement should be agreed upon. I also think that Portland cement in future should be valued, like every other merchandise, according to its quality, namely, tensile strength.

THE ILLUSTRATIONS.

THE CHURCH OF THE MESSIAH, ST. LOUIS, MO. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

OLD HOUSE ON SALEM ST., BOSTON, MASS. SKETCHED BY MR. G. R. TOLMAN, ARCHITECT.

The following is all that it has been possible to ascertain of the history of this house: An elderly lady, a former tenant, says it is two hundred years old. Mr. William Locke, a former owner, had some facts relating to it, but has lost and forgotten them, except that the timber of which it is built was cut on the spot, in Cooper Street and vicinity. Up the court, at the first window beyond the door, on a pane of glass, cut with a diamond, is "Lydia Greenleaf at Boston 1796." It is believed that the house is as old as represented, evidently being of the same style of work as the "Old Corner Store," in Dock Square, built in 1690, said to be the oldest one in Boston. The Salem Street building consists of a block of two, with a number of rambling tenements extending up the back yard.

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HOUSE ON COMMONWEALTH AVENUE, BOSTON, MASS. MR. J. P. PUTNAM, ARCHITECT, BOSTON, MASS.

THE STRENGTH OF BEAMS.

BY F. E. KIDDER, B. C. E.

A large proportion of our architects and constructors guess at the required dimensions of the beams and girders they may need to use in construction, because they have no simple method of calculating the proper size. It is the object of this article to present the subject of the strength of beams, and particularly iron beams, in such a simple and practical form that any architect or builder who can substitute figures for letters in a simple formula may be able to calculate with accuracy the exact dimensions of a beam desired to carry a certain load.

The following is the notation employed in the formulæ: —

Let a, and a', denote constants derived from experiments on the different materials; b, the breadth of the beam in inches; d, the depth of the beam, also in inches; I, the moment of inertia, the axis being at right angles to the longitudinal axis of the beam; L, the length of the beam between bearings, in feet; l, the length of the beam between bearings, in inches; M, the bending moment; W, a uniformly distributed load; W', a concentrated load applied at the centre; W'', a concentrated load applied at some point other than the centre; and R, the modulus of rupture.

The fundamental formula from which all others must be derived is obtained by placing the *bending moment* of the beam equal to the *moment of resistance*, and is expressed by the formula: —

$$My = RI, \text{ or } M = \frac{RI}{y}, \qquad (1.)$$

y, in beams of regular cross-section, being equal to one-half of the depth.

The method of obtaining the values for the different quantities used in the above formula can be found in any large treatise on the strength of materials but we shall here present only the final formulæ, after we have simplified them as much as we can.

The following formulæ will serve for the calculation of *rectangular wooden beams*, under the different cases occurring in building construction.

BEAMS FIXED AT ONE END.

Loaded at the extreme end: —

$$W'' = \frac{b \times d^2 \times a'}{5 \times L}, \text{ or } b = \frac{5 \times W'' \times L}{d^2 \times a'}. \qquad (2.)$$

For the sake of simplifying computations, a' is substituted for $\frac{1}{75}$ of the modulus of rupture, or $a' = \frac{R}{75}$.

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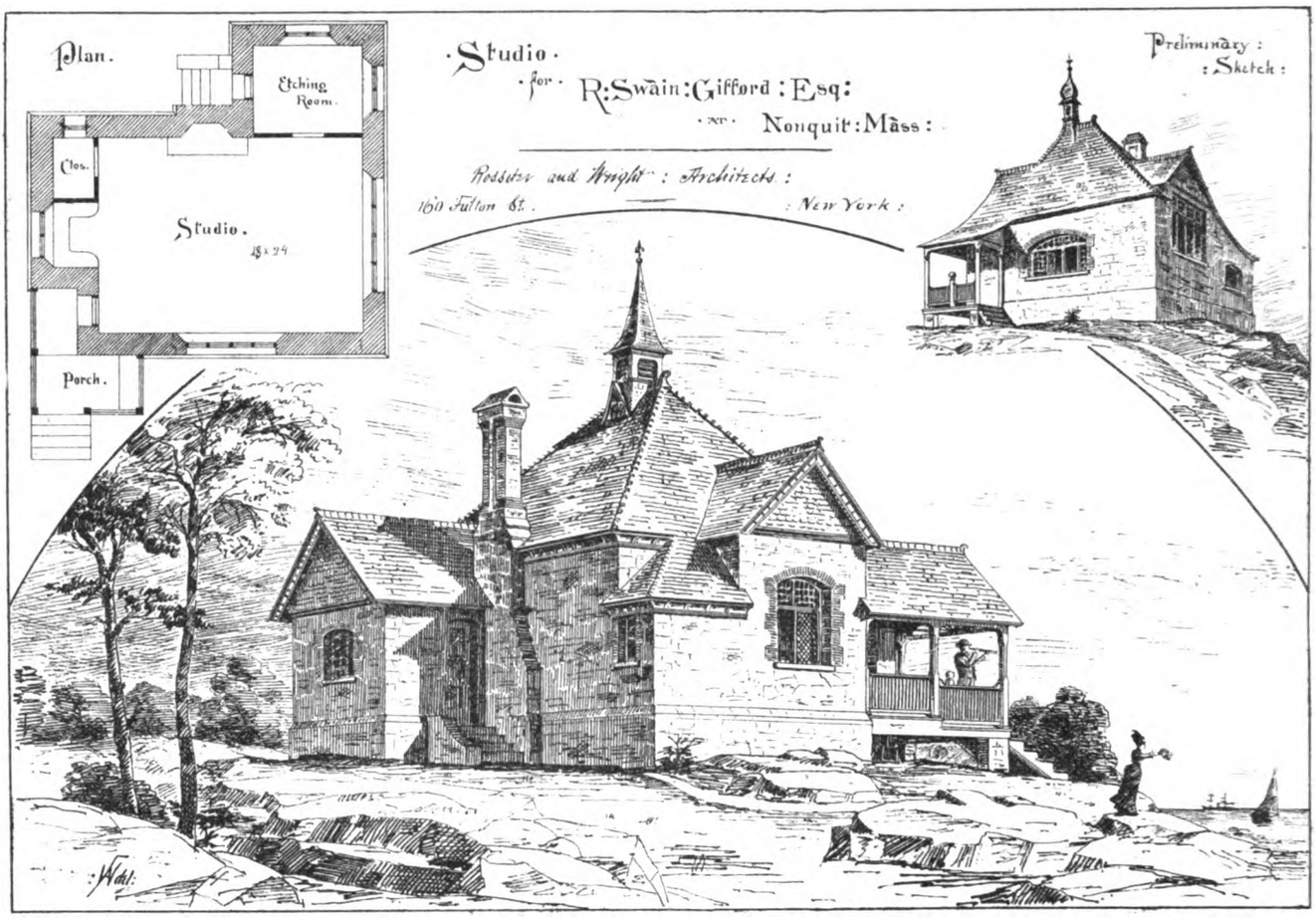

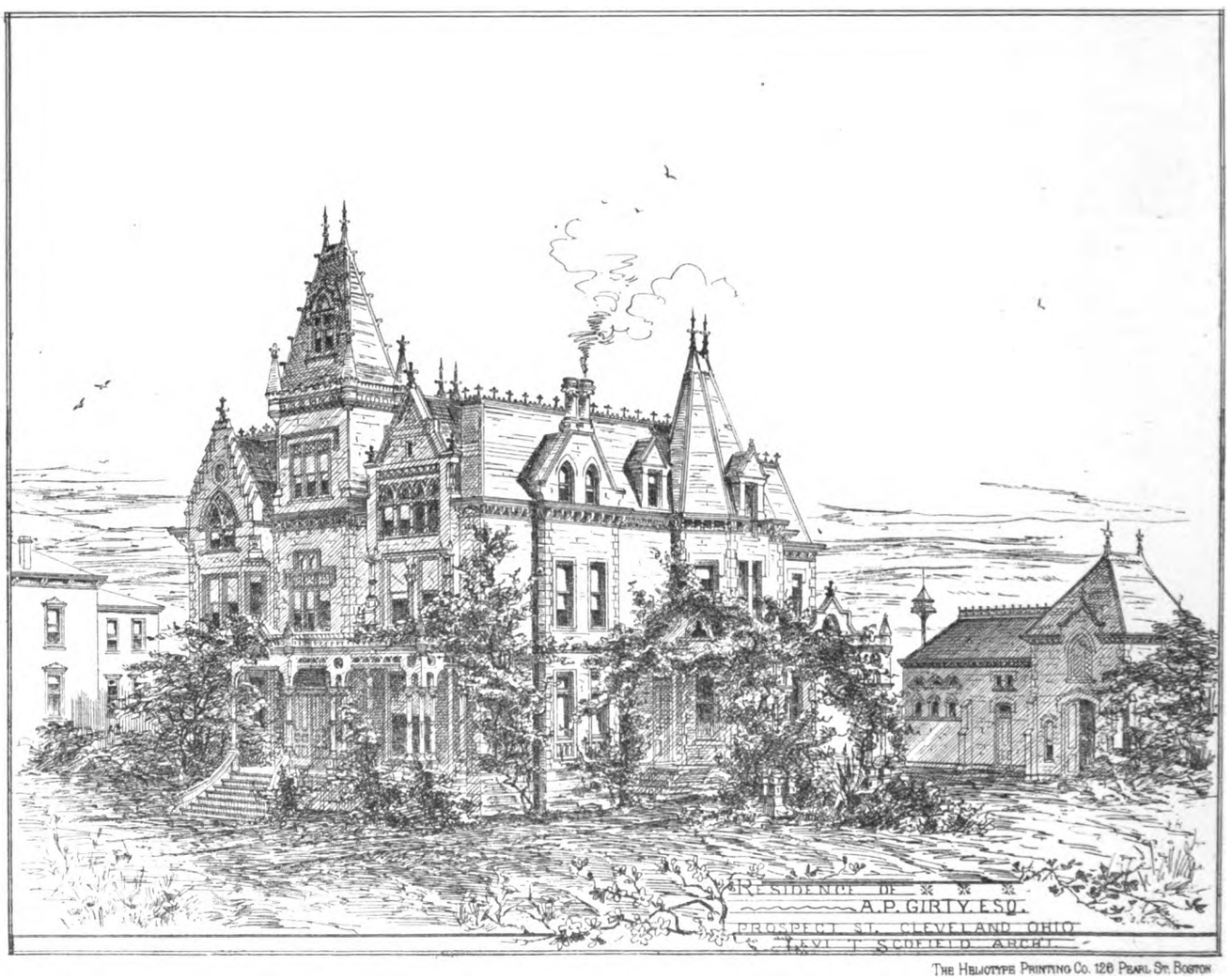

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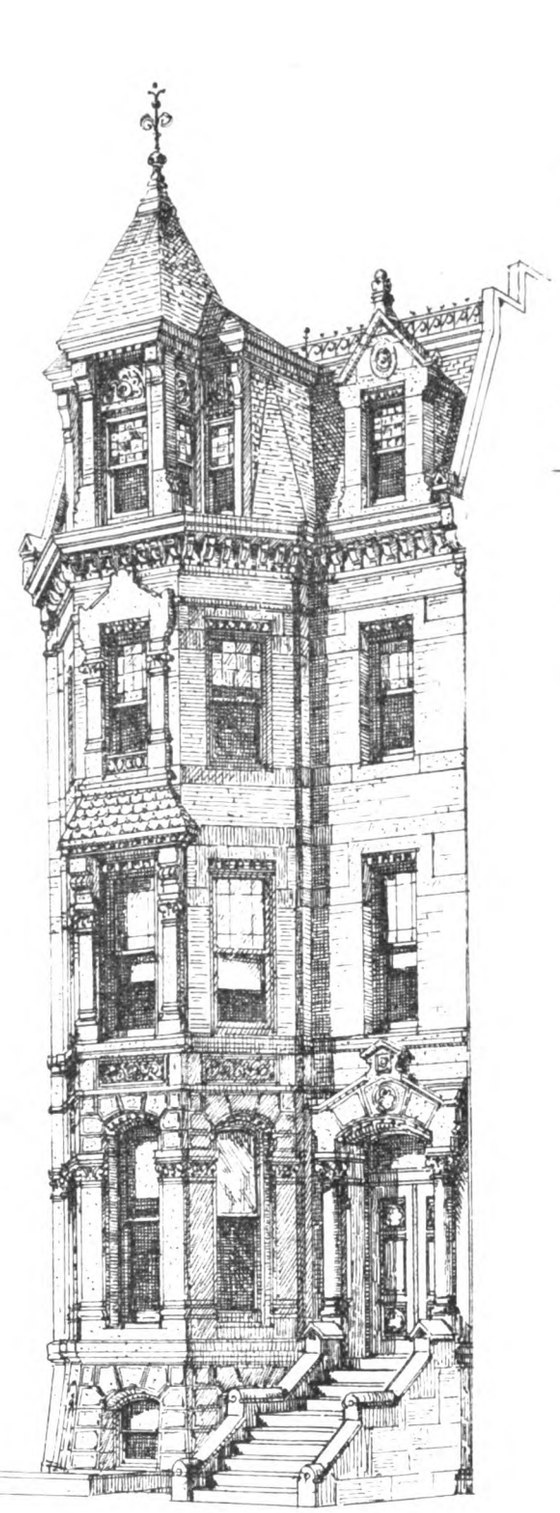

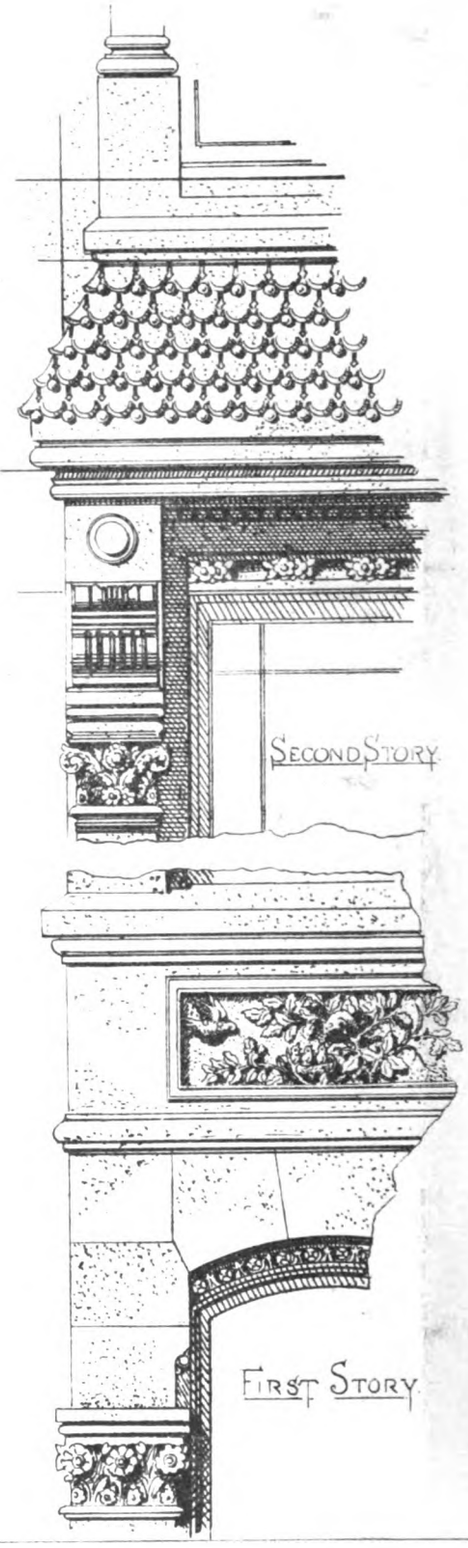

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"The Last of the Line"

Dormer Window.

Section of Roof.

Gable.

Rear Entrance.

SKETCH DETAILS.

NORTHERLY VIEW.

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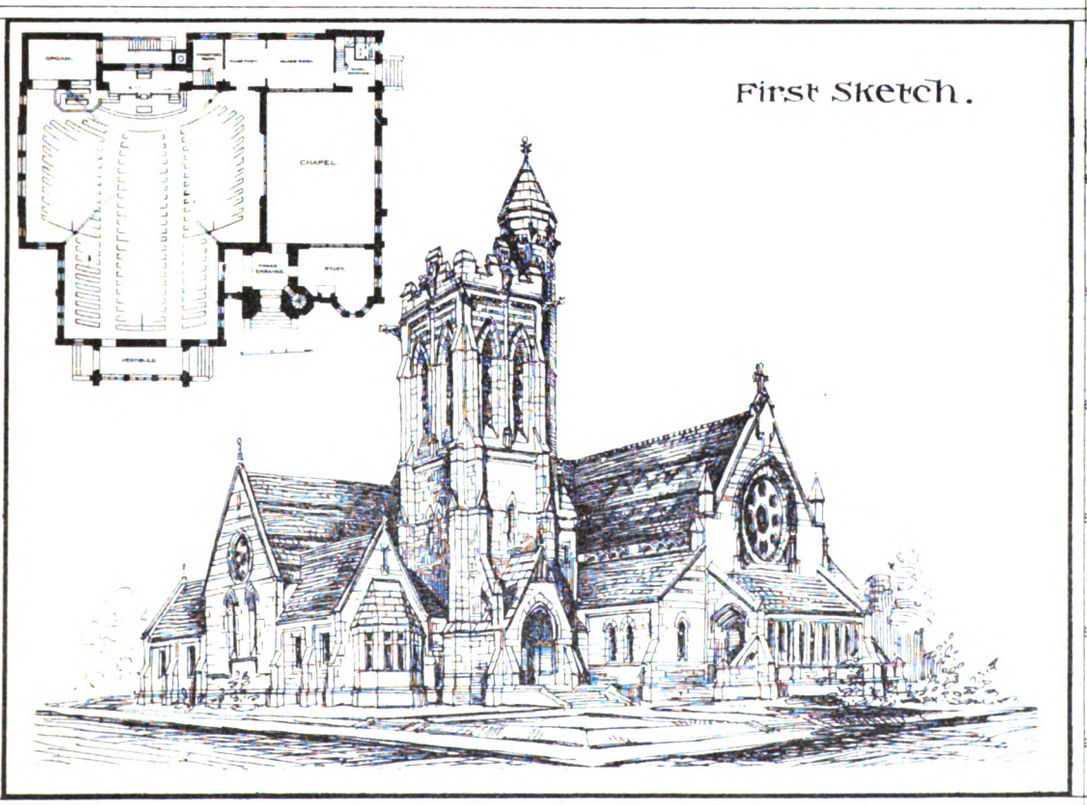
View of Church as now building.

THE CHURCH OF THE MESSIAH ST. LOUIS MO.

AD 1880

PEABODY & STEARNS ARCHTS. BOSTON MASS.



First Sketch.

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Loaded with a uniformly distributed load: —

$$W = \frac{2\,(b \times d^2 \times a')}{5 \times L}, \text{ or } b = \frac{5 \times L \times W}{2 \times d^2 \times a'}. \quad (3.)$$

BEAMS SUPPORTED AT BOTH ENDS.

Loaded with a uniformly distributed load: —

$$W = \frac{2 \times b \times d^2 \times a}{5 \times L}, \text{ or } b = \frac{5 \times L \times W}{2 \times d^2 \times a}, \text{ in which } a = \frac{R}{18}. \quad (4.)$$

Load applied at the centre: —

$$W' = \frac{b \times d^2 \times a}{5 \times L}, \text{ or } b = \frac{5 \times L \times W'}{d^2 \times a}. \quad (5.)$$

Load applied at a point other than the centre, m and n being the segments into which the beam is divided.

$$W'' = \frac{b \times d^2 \times L \times a}{5 \times 4 \times m \times n}, \text{ or } b = \frac{5 \times W'' \times 4 \times m \times n}{d^2 \times L \times a}. \quad (6.)$$

In the above formulæ the figure 5 is what is known as the factor of safety, and is the one recommended by the best engineers for wooden beams subjected to a dead load. For a live, or moving load, 10 should be used, as a live load is twice as severe in its effects on a beam as a dead load. If the ultimate, or breaking load, is desired, the factor of safety, 5, should be omitted.

	a	a'		a	a'
American ash	590	148	Hemlock	380	95
" red beech	580	145	American red oak	562	140
" yellow birch	534	134	" white oak	581	145
" white cedar	255	64	" white pine	461	115
" elm	338	84	" yellow pine	725	181
New England fir	367	92	" spruce	548	137

In want of other values for white and yellow pine, I have used values determined from very careful experiments on these woods made by myself, of which a full report is given in the February number of Van Nostrand's *Engineering Magazine*.

In order that the application of these formulæ may be thoroughly understood, I will give examples of the cases most commonly met with.

EXAMPLE 1. — What is the greatest load that a yellow pine beam 8 × 10 inches, supported on two piers 15 feet apart, will carry with safety, if the load is uniformly distributed? Formula (4) is the one which covers this case, and substituting the values for the letters, we have: —

$$W = \frac{2 \times b \times d^2 \times a}{5 \times L} = \frac{2 \times 8 \times 100 \times 725}{5 \times 15} = 15{,}466 \text{ lbs.}$$

EXAMPLE 2. — What shall be the dimensions of a spruce beam that shall be able to carry with safety a concentrated load of 9,000 pounds, applied at the centre, the distance between the supports to be 12 feet? In this case we are to determine the breadth and depth of the beam, but in order to do so, it is necessary to assume a value for either b, or d, and as the strength of the beam varies as the square of the depth, and only directly as the breadth, it is better to assume a value for d, and solve for b. Assuming, in this case, d to be 10 inches, and substituting in formula (5), we have: —

$$b = \frac{5 \times L \times W'}{d^2 \times a} = \frac{5 \times 12 \times 9{,}000}{100 \times 548} = 10 \text{ inches.}$$

If we had taken $d = 11$ inches, we should have got $b = 8$ inches, which would be the more economical beam, and have the same strength.

From an inspection of formulæ (2), (3), (4) and (5), we see that the relative strength of the rectangular beam, in the different cases, is as follows: —

Beam supported at both ends, and loaded with a uniformly distributed load 1
Beam supported at both ends, and loaded at the centre . . . . $\frac{1}{2}$
Beam fixed at one end, and loaded with a uniformly distributed load. . . . . . $\frac{1}{4}$
Beam fixed at one end, and loaded at the other . . . . . $\frac{1}{8}$

I-BEAMS. — Where it is necessary to carry very heavy loads, iron beams, of the form of the letter I, are generally used.

If we consider the web to merely connect the flanges, we should have for the safe distributed load: —

$$W = \frac{14{,}000\left(b \times d^2 - \frac{b' \times d'^2}{d}\right)}{3\,L}. \quad (7.)$$

where b equals the breadth of the flange; d the total depth of the beam; b', the sum of the breadths of the lateral hollows; and d' equals depth of the web. But it is more convenient, and practically nearly as accurate, to consider the web to run the whole depth of the beam, and the flanges to be merely fastened to the web.

On this supposition we have the formula for the distributed load: —

$$W = \frac{112{,}000 \times d}{12\,L}\left(\frac{A_1}{6} + \frac{A \times d_1^2}{d^2}\right). \quad (8.)$$

in which d denotes the depth of the beam; d_1 the effective depth of the web; A_1 area of web; A, area of one flange; and L, the length between bearings.

Formula (8) is the one used by the engineer of the Union Iron Mills, Pittsburgh, Pa., in calculating the strength of their beams.

EXAMPLE. — What is the largest uniformly distributed load that a heavy 10-inch I-beam, of the Union Iron Mills pattern, will bear with safety, the distance between supports being 10 feet?

From a book of sections, published by this company, we find $A = 3.15$ square inches; $A^2 = 5.1$ square inches; $d_1 = 9.19$ inches; and $d, = 10$ inches. Substituting these values in formula (8), we have: —

$$W = \frac{112{,}000 \times 10}{120}\left(\frac{5.1}{6} + \frac{3.15 \times 9.19^2}{100}\right), = 32{,}760 \text{ lbs.}$$

In most cases, however, it is not necessary to go to the trouble of substituting in the above equation, as the moment of inertia is generally given in the book of sections, issued by the different iron companies. When this is the case, we have only to substitute in the formula: —

$$W = \frac{224{,}000\,I}{L \times D}. \quad (9).$$

N. B. In the last three formulæ a factor of safety (3) is assumed.

Taking the same beam used in the above example, we find from the table of sections, the value of I to be 175.5, which being substituted in formula (9), together with the values of l and d, gives $W = 32{,}760$, the same as before.

Also, some of the iron companies publish hand-books of their beams, columns, etc., which give the safe load for each beam, for spans of different lengths, so that the architect has only to look in these tables, and find the size of beam whose safe load is equal to the load it is desired that the beam should carry.

But there are probably many who have not these hand-books, or do not understand using them, and for such I have prepared the folfowing tables, made up from tables published by the Union Iron Mills, and those published by the Trenton Iron Works, Trenton, N. J.

TABLE I.

UNION IRON MILLS ROLLED I-BEAMS.

Designation of Beam.	I. Weight per yard in lbs.	II. Safe distributed load for 1 ft. of span in lbs.	III. Moment of Inertia.	IV. Width of flanges in inches.	V. Areas in square inches. Flanges.	VI. Web.	VII. Total area.
15 inch heavy	201.	848,000	682.	5.5	10.35	9.75	20.1
15 " light	150.	658,000	528.7	5.0	8.40	6.60	15.0
12 " heavy	180.	582,000	373.7	5.15	8.64	9.36	18.0
12 " light	126.	416,000	267.	4.5	6.36	6.24	12.6
10½ " heavy	105.	308,000	173.8	4.63	5.25	5.25	10.5
10½ " light	94.5	276,000	154.9	4.53	5.16	4.30	9.46
10 " heavy	114.	328,000	175.5	4.5	6.30	5.10	11.4
10 " light	90.	278,000	149.0	4.3	5.80	3.20	9.00
9 " heavy	90.	246,000	118.7	4.34	5.85	3.15	9.00
9 " light	71.25	206,000	100.	4.06	4.79	2.34	7.13
8 " heavy	81.	196,000	84.8	4.	5.22	2.88	8.10
8 " light	66.	164,000	70.4	3.75	4.37	2.24	6.61
7 " heavy	60.	132,000	49.2	3.63	4.18	1.82	6.00
7 " light	54.	124,000	47.0	3.56	4.15	1.26	5.41
6 " heavy	48.	90,400	29.2	3.38	3.37	1.44	4.81
6 " light	40.5	76,600	24.7	3.22	2.85	1.20	4.05
5 " heavy	36.	51,400	13.8	2.88	1.85	1.75	3.6
5 " light	30.	43,800	11.8	2.75	1.85	1.15	3.0
4 " heavy	30.	32,600	7.0	2.63	1.44	1.56	3.0
4 " light	24.	28,000	6.0	2.50	1.44	.96	2.4
3 " heavy	24.	19,600	3.2	2.34	1.39	1.01	2.4
3 " light	21.	18,200	2.9	2.25	1.38	.72	2.1

TABLE II.

TRENTON ROLLED I-BEAMS.

Designation of Beam.	I. Weight per yard in lbs.	II. Safe distributed load for a span of 1 ft. in lbs.	III. Moment of Inertia.	IV. Width of flanges in inches.	V. Areas in square inches. Flanges.	VI. Web.	VII. Total area.
15 inch heavy	200	748,000	707.1	5.75	10.95	9.07	20.02
15 " light	150	551,000	523.5	5.	7.45	7.59	15.04
12½ " heavy	170	511,000	391.2	5.5	9.38	7.39	16.77
12½ " light	125	377,000	288.0	4.8	6.58	5.75	12.33
10½ " heavy	135	360,000	233.7	5.	8.43	4.93	13.36
10½ " light	105	286,000	185.6	4.5	6.51	3.93	10.44
9 " extra	125	268,000	150.8	4.5	7.20	5.13	12.33
9 " heavy	85	189,000	106.5	4.	4.86	3.46	8.32
9 " light	70	152,000	86.6	3.5	3.83	2.70	6.53
8 " heavy	80	168,000	83.9	4.5	5.07	2.96	8.03
8 " light	65	135,000	67.4	4.	3.97	2.40	6.37
7 " 55 lbs.	55	101,000	44.3	3.75	3.40	2.10	5.50
6 " 120 "	120	172,000	64.9	5.25	8.09	3.75	11.84
6 " 90 "	90	132,000	49.8	5.	5.70	3.00	8.70
6 " heavy	50	76,800	29.0	3.5	3.11	1.80	4.91
6 " light	40	62,600	23.5	3.	2.51	1.50	4.01
5 " heavy	40	49,100	15.4	3.	2.34	1.56	3.90
5 " light	30	38,700	12.1	2.75	1.79	1.20	2.99
4 " heavy	37	36,800	9.2	3.	2.41	1.25	3.66
4 " light	30	30,100	7.5	2.75	1.91	1.00	2.91
4 " ex.light	18	18,000	4.5	2.	1.02	.75	1.79

The values for the safe distributed load given in column II. are for *one foot* of span, and to get the load for any span it is only necessary to divide the load for a span of *one foot*, by the given span, *in feet*.

To get the safe load, if applied at the centre of the beam, divide the safe distributed load by 2.

In designing an iron beam, *the weight of the beam* itself should be subtracted from the calculated load, to give the *true working load*.

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In order to illustrate more clearly the method of applying the above tables, two practical examples will be given, which may serve as types for similar cases.

Example 1. — It is proposed to support the floor of a lecture-hall by means of rolled-iron I-beams, resting upon piers 15 feet apart; what size beam will be required?

Ans. — If the beams are 15 feet span, and 12 feet "on centres," they will each have to support a floor area of 12 × 15, or 180 square feet. The average weight of a wooden floor, including joists, etc., is about 10 lbs. per square foot, which would give 1,800 lbs. dead load on each beam.

The load that is to come upon the floor should be taken at 120 lbs. per square foot, making 21,600 lbs. live load on each beam, and this is equivalent to 43,200 lbs. dead load. Combining the two loads, we have as the total dead load on each beam, 45,000 lbs. Now in order to find from the table the size of beam necessary to carry this load, we must multiply the total load by the span, which is the same thing as dividing the values in column II. by the span. 45,000 × 15 = 675,000, and looking in column II. of tables I. and II. we find that the beam carrying a safe load, next above this, is the 15-inch heavy. Therefore, this must be the size required. The weight of this beam will be, 201 × 5, or 1,005 lbs., for the "Union" beam, and 200 × 5, or 1,000 lbs., for the "Trenton" beam.

Example 2. — It is required to support a 16-inch brick wall, 30 feet high, and 15 feet wide, and containing six windows, three feet by six feet, by two rolled-iron I-beams. What must be their size?

Ans. — It is first necessary to find the cubic contents of the wall. If the wall were solid, with no windows, it would contain $1\frac{1}{3} \times 15 \times 20$, or 600 cubic feet of brick. But the six windows will contain $6 \times 1\frac{1}{3} \times 3 \times 6$ or 144 cubic feet of brick; so that the contents of the wall is 600 — 144, or 456 cubic feet of brick. A cubic foot of brickwork weighs, on the average, 110 lbs., hence the weight of the wall will be 456 × 110 lbs., or 50,160 lbs. The load on each beam will therefore be 25,080 lbs. dead weight. Multiplying this by the span, we have 376,200 lbs., and looking in column II. of tables I. and II., we find that we shall need a 12-inch light "Union" beam, or a $12\frac{1}{4}$-inch light "Trenton" beam, to carry this load, and it will require two of these beams to support the wall. The weight of the 12-inch beam will be 5×126, or 630 lbs., and of the $12\frac{1}{4}$ inch beam 125×5, or 625 lbs.

REGULATIONS FOR OPEN COMPETITIONS FOR ARCHITECTURAL WORK.

A SCHEDULE OF TERMS ADOPTED BY THE ST. LOUIS INSTITUTE OF ARCHITECTS, AND OTHER ARCHITECTS OF THE CITY OF ST. LOUIS.

1. — The instructions must not require more drawings than are necessary in order clearly to explain the design, and should require that the designs submitted be drawn to a uniform scale, which must be clearly defined; and that all perspectives required be drawn to the same scale as the geometrical drawings, and on a plane at the corner of the building nearest the point of sight; a deviation from which will cause their rejection. Perspectives, unless called for in the instructions, to be excluded.
2. — In case the amount to be expended is limited, the instructions must state that an excess of ten per cent on the expense of executing any design, over and above the sum mentioned, will exclude it from competition; the amount of expense to be determined by the expert in the jury.
3. — A design will be excluded from the competition if sent in after the stated period, and if it contains deviations from the instructions.
4. — The period given for preparing the design must be long enough not only for perfecting it and preparing the necessary drawings, but must make some allowance for the ordinary occupations of competitors. An explicit statement must be given as to the time when the decision on the merits of the designs is to be rendered, and that all designs shall be returned to the authors of the same. An architect's drawings are his own private property unless paid for, in which case they are for the sole use and benefit of his client; but the actual drawings still belong to the architect who made them. Always belong to architect.
5. — The designs should be submitted to a jury; one of whom should be an architect. No person should serve as a juror who submits a design, or is in any way interested in any design submitted, or who has not renounced all intention of participating in the execution of the work.
6. — In the case of open competitions, the amount of premiums in the aggregate should not be less than the amount which the architect would have received had there been no competition.
7. — It is recommended that in close competitions wherein the number of competitors is limited, a sum equal to the full value of one design be divided equally among the authors of all except the premiated design, which shall be compensated as provided for in the last preceding rule.
8. — The instructions shall state that in case the building is erected after any of the designs submitted in competition, it shall be given in charge of the author of the first premiated design, who is to be employed at the usual compensation.
9. — The premiums should be awarded under all circumstances for the designs which may have been admitted in competition.
10. — It is recommended that, in the schemes of competition, it shall be provided that the names of the competitors shall not be known to the jury.
11. — The rates of compensation referred to in the previous articles are to be the same as are acknowledged by the St. Louis Institute of Architects.

ARCHITECTURAL EDUCATION IN ENGLAND AND GERMANY.

We find from the columns of the *Cologne Gazette* that the question of architectural education is exciting as much attention in Germany as it has done in England, with this difference, — that the people of Germany are more interested in the discussion of such matters than the English people. While we have been insisting on the need of the technical education of architects, the public and some members of the profession in Germany have been deploring the fact that they have too much of it, and that the architecture of their country has suffered in consequence, and is less vigorous and healthful than our own. The controversy, which has been waged with much spirit and warmth in Germany, owes its origin, we believe, to the remarks of Dr. August Reichensperger in the Prussian Diet, in which assembly the subject has been warmly debated. Dr. A. Reichensperger has strongly taken up and espoused the English system, and has openly charged the national system with faults and shortcomings, and called upon the Minister of Public Works to apply a remedy by official interference. As might be expected, these remarks, delivered last December, have produced a sensation among the profession in Germany, and one architect of eminence has published a reply in the *Cologne Gazette* extending over three articles of considerable length. Herr Reichensperger is not a professional architect; he speaks more from the popular side of the subject, and his remarks must be taken with some reserve. At the same time, we must admit that he represents the public sentiment, and he has found no difficulty in contrasting the freedom and individual vigor of the English school of architecture with the scientific, hard, barren, and formal style of that of his own country. Recent intercourse between the two countries must have made the visitor from Germany feel that our buildings were less cast in the same mould, bolder in conception, and less niggardly in ornament, than those of his own land. Herr Reichensperger is struck with the development in England of the Gothic and other styles of architecture, — the freedom and originality with which they are treated by English architects; and he approves in the strongest terms of the pupil-system of architectural education in this country, which he says is an adherence to and a development of the mediæval system of "master-schools," or those in which the styles of individual masters of the art were perpetuated with all their individuality of power; and he maintains that it is only possible under such conditions for the conceptions of untrammelled genius to be encouraged, or for a national style to take root. It is clear to us that Herr Reichensperger is one of those *dilettanti* of whom we have several in this country, who affect to despise all native effort, and to cast an eye abroad for everything that is excellent, — an idea in which we find we are supported by the remarks of the writer in the *Cologne Gazette*, who says that Reichensperger judges of English architecture from what he has seen, not from its intrinsic value. This disaffected amateur might learn more if he read the architectural treatises and correspondence in this country; he would then be better able to compare the essential differences and qualities of the architecture of the respective countries. No one knows better than an English architect the good and bad qualities of English art; and before sensational contrasts are drawn between the buildings of Germany and England, the critic should possess more than a superficial acquaintance or a mere first impression of the works of this country. It is in this rough-and-ready sort of way that Herr Reichensperger contrasts the great national buildings of England with the plain and prosaic structures erected in modern times in Germany, which, he says, may be useful and scientific, but excite no admiration, without considering the actual conditions that have made them so uninteresting as works of art. There is a German term, "*Bauinspectoren Gothik*," which signifies "official building inspectors' Gothic," and has become proverbial, which may help this hypercritic to understand the real causes for the stagnation of thought he complains of, though he himself employs it to deprecate German architecture.

The writer of the articles in the *Cologne Gazette* ably challenges many of the conclusions of this would-be reformer, but we must here content ourselves with giving the gist of his reply. The author is a professional architect, and evidently knows only too well the difficulties the architect in his own country has to encounter. In the first instance he shows that Germany is not rich enough to compete with England; he says that the want of magnificent buildings in Germany is due chiefly, not to deficiency of taste, or the absence of high artistic aspirations, but to want of money. In Germany the buildings are cheap, and are, therefore, meagre and poor. They are under the control of government officials, a system which must be acknowledged to restrain inventive ability, but the very circumstance of the nation being poor renders it necessary for the State to patronize and take under its care the architectural and technical education of the profession. We are very justly told that if architecture were

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left to private patronage in Germany, as it can well afford to be left in England, its prospects would not be encouraging. It would fare worse than it does now. The architecture would not merely be poor, but if no State education for architects existed, it would become coarse or vulgar in conception and detail. By confining study to one style, the State secures at least good architecture, if it often falls into the commonplace. We cannot, however, deny that State patronage and its restrictions seriously limit and curb the individual freedom of the architect; and the writer in the *Gazette* allows that German architecture would gain if a little of the English spirit of originality and independence were infused into it. He maintains, nevertheless, that if Germany stands in need of this spirit, England would be to a larger extent benefited if her architects' study were less one-sided, and more subordinated to the scientific and utilitarian rules of the art. He observes with justice, and from a knowledge of the results of architectural works in this country, that architects regard too much the mere outward effect of their buildings; in illustration of which he points to the result of the competition for the new German House of Parliament, for which a few English architects competed: several beautiful English designs were rejected, with the exception of one which was awarded a second prize, because, as the author observes, all the artists had studied was outward appearance, the plans being devoid of all attempts to supply practical wants. With one voice it was acknowledged by those capable of judging, that the designs were full of defects, badly arranged in plan, full of draughts, and fell wofully short of the requirements of such a building. The award was pronounced a scandal. We commend to the reader the passage relating to this subject at the close of the writer's second article. He declares, moreover, that Herr Reichensperger has been hard upon German architecture, because the Parliament-Building design promoted by him has not found favor.

Discussing the vexed subject of the different systems of technical education for architects in England and Germany, the writer of the articles we are noticing boldly appeals to English professional opinion in corroboration of his own views, and it appears to us that in this final appeal he has considerably weakened the position of his opponent. He points Herr Reichensperger to the fact that for the last twenty years the English profession have been trying to insist on education; and that that critic can know nothing of the English agitation, or must have purposely ignored it, to have drawn the conclusions he has done. This fact, the writer thinks, is the best answer to the charges brought against the German system of technical education. In confirmation of this assertion, the professional critic refers to our own pages, and to those of *Nature* and other scientific journals, which have for years past abounded in appeals in favor of a reform of the English system of architectural education on the lines of that in vogue in Germany. The writer's arguments agree in the main with what we have said from time to time upon the question. He also quotes Mr. R. Phené Spiers's remarks touching the shortcomings of English architecture at the Paris Exhibition, which were reported in this journal, in which that gentleman referred to France and Germany as possessing superior theoretical teaching, from which the English architects might derive profit. The formation of architectural classes and technical schools in England, and the proposed technical college at South Kensington, to be endowed by the City Guilds, are instances cited to show that the English recognize the advantage to be derived from the very system which Herr Reichensperger assails. It is contended that it is precisely in those features of the German training that critic most disparages, that the English architects feel that they are most in need of. There is a prevailing idea, founded upon some experience, that anything like State education would nip in the bud or check individual effort, and that a system of professional education for architects would suppress, or completely destroy, the artistic instinct. It is true that the native artists of India and Japan have suffered to some extent from the spread of technical education, and the general fact has been alluded to by many writers on education, and lucidly stated by Macaulay in his well-known essay on Milton. That far-seeing exponent of architectural art, Viollet-le-Duc, has also defended the freedom of architects by boldly denouncing the system of academic monopoly which largely prevails in his own country; he has shown that where, as in the domain of letters and philosophy, painting and sculpture, there exists no intermediate authority between the artist and the public, no monopoly and interference, but where the appeal to the public is direct, the students of science, art, or literature are benefited; and he proceeds to contrast this state of encouragement of the individual with the condition of those who lock themselves up in the Villa Medici, or are bound by the arbitrary academic rules in matters of style and taste. Viollet-le-Duc was discriminate enough to see that it was not because of a school of art that architecture declined, but because its founders placed the art beyond the control of public opinion, becanse they became a mere *coterie*, and founded a kind of protectorate that was inimical to the interests of art. "If it would be really a school," he says, "it should derive all its influence from discussions, the exchange of ideas, and the emulation resulting from rival principles, freely manifesting themselves under the control of public opinion." He concludes that in France, architecture, above all other arts, presents conditions favorable to the prolongation of mediocrity. The French Academy has been credited with the conventional reproduction of antique forms, with a set of rules and processes which have been called the very negation of art, which is said to have given us nothing but a miserable parody of the beauties of antique taste. In Germany the heads of the pupils are, according to authorities, crammed with theories, which have acted, no doubt, prejudicially, and restricted artistic genius and invention. In many recent works on architecture, the tendency of State interference in the matter of design is clearly seen; there is a mechanical restraint, an official routine, expressed in the very lines and features of German architecture, but it is absurd to lay the charge to the influence of technical education simply. We quite agree with the remark that up to a certain point engineering and architectural studies might go together, after which they should be totally independent. We are told that the English system of instruction is not education, but merely a kind of training. It is certainly very little more; the young pupil imbibes his notions and taste from his master, or discovers them for himself. But with proper safeguards against the suppression of individual taste and enterprise, there is no need of a system of scientific education operating prejudicially. The fault is in setting up a standard of taste, an art bureaucracy; and this has been, from what we have gathered, the prevailing defect in the system, not only of France, but of Germany. The articles we have alluded to are well worthy the perusal of English architects, and we commend the controversy to the attention of the profession at large. — *The Building News.*

AMERICAN SHADE TREES.

In the growth and spread of popular tastes in all parts of America, particularly as regards the ornamentation of our home surroundings, there is a noticeable general solicitude to learn what are the best kinds of shade trees to plant about our homesteads. The subject is one of peculiar importance. It calls for the exercise of the most thorough, mature and perfect judgment. Vegetation of every kind has individualities and characteristics, and these have to be studied and understood. The trees of our country are not more diverse in their kinds, than are the soils, the climates, the seasons, the positions of trees, their exposure, their relative demands for moisture and drainage, and all the other concomitants which make up the problem of successful arboriculture, whether for shade and ornament, or for fruits and their many enjoyments. The first needful thing in choosing American shade trees is to know which of all the diverse families of forest growths, indigenous to the different parts of our country, are best adapted to grow vigorously and rapidly, and so as to produce the largest amount of shade in the shortest lapse of time. This is the main thing to aim at, for the reason that much the greatest number of trees are of slow growth, — slow in comparison with the shortness of human life. Let us consider this subject carefully; and to do so, let us divide the United States into four ideal districts, so far as regards our country lying east of the Rocky Mountains. These large districts will therefore be properly named and described as follows: —

1. The north-western belt: this may be regarded as extending from the Upper Ohio River westward to the foot-hills of the Rocky Mountains.

2. The Atlantic front, the Alleghanies, and the trans-Alleghany region: all these extending from the St. Lawrence and the Lakes, thence southward to the south end of the mountain-chain, — the Alleghanies.

3. The central Western States, and also those parts of the several regions not embraced in area No. 1.

4. The southern and south-western regions: this area sweeps through the lower parts of South Carolina, and all Georgia, Alabama, Florida, Mississippi, Louisiana and Texas.

In the first three districts the good, thrifty and rapidly-growing trees which are most thoroughly adapted to use as shade and ornamental trees are, in the order of excellence: ash, poplar or tulip-tree, cottonwood, balm of Gilead, buckeye or horse-chestnut, catalpa, chestnut, Lombardy poplar, willow of several kinds, Lynn, mulberry, wild cherry, cucumber tree, ailanthus or "tree of heaven," silver-leaved poplar or quaking ash. To these, it is probable, can be added the famous and monstrous "eucalyptus," a tree of Australia, which actually attains the wonderful height of two hundred and fifty to three hundred and fifty feet. The "eucalyptus" of those South Pacific climes, and the redwood tree, or *sequoiæ* of California, are the loftiest and largest growths of trees yet known anywhere in the world. These sixteen kinds of trees, including the three trees introduced from abroad, viz., the "Lombardy poplar" from Lombardy in Europe, the "ailanthus" from China and the East Indies, and the "eucalyptus" from New Holland or Australia, are trees which are easy of propagation and generally or always exempt from predatory worms and insects, clean in styles of growth, handsome in form, quick of growth, and picturesque in the landscape. Some of them add a fine effect to the prospect of any country. The weeping willow, the silver-leaved poplar or quaking ash, the Lombardy poplar, the ash, the chestnut and the buckeye are especially handsome to view when they are either near or far off. These sixteen varieties of trees are especially recommended to notice and adoption as shade and ornamental trees, having more particularly in mind the requirements of the greatest quickness of growths. If, therefore, to this characteristic can be added the qualities of healthiness, cleanliness, grace of form, and beauty of effect, we shall gain a combination of advantages by choosing these special classes of trees to embellish rural estates and

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set off the grounds about suburban villas. All or nearly all the trees above named will thrive in either of the first three districts mentioned.

All such trees are usually to be found in the nurseries, except the *sequoiæ* and the eucalyptus. They can be obtained as seeds or scions by addressing the United States Commissioner of Agriculture, Washington, D. C., whose able and interesting reports speak of these remarkable trees. Nearly all the varieties, or more than three-fourths of them, in the above list of trees can be found in or about our American woodlands, and all of them attain a reasonable growth in a short period — say from four to six or eight years from the time of planting the young saplings. Their average rates of growth for each tree per annum range from two and one-half to five feet, according to the care of planting, and are determined by the nature of the soil and course of the seasons. The eucalyptus is known to grow at the rate of ten to twenty feet per annum. In area No. 4, — the southern and south-western regions of the American Union, — all these kinds of trees will do well, and to them may now be added some other trees which will flourish in the south and south-west parts of our Republic east of the Rocky Mountains. These are the following varieties, viz., such as the China-tree or "Pride of China," "Bois d'Arc" or Osage orange, Spanish oak (seen in the Alleghanies), walnut (both the black and the white), cypress (in some low places of the Mississippi Valley and Atlantic front), and cedar. These twenty-two kinds of trees are easily obtained. Besides, other varieties that can be named would increase the number perhaps to as many as thirty-five to forty kinds.

The growth of the different sorts of trees in the above list is probably much more rapid than the growth of any other kinds of trees known in any settled parts of America. It has been recommended by persons who are familiar with the eucalyptus, that it should be introduced into all portions of our country for the following reasons: it is a very rapid grower; it makes a beautiful and thick shade; it has a tall and picturesque form; it is unique in being unlike all American trees; it exudes a gum that has useful qualities; it emits an odor that proves to be a fever destroyer by its tendency to promptly and surely absorb all malaria; it is very sure to grow, when properly taken up and carefully planted, and it requires but little care to do this. It has been introduced into several parts of Europe within the past fifteen years, and it flourishes well there. The eucalyptus grows in favored spots and in climes well suited to it, at the rate of ten to fifteen feet per year, even fifteen to twenty-five feet in some places. The remarkable virtues which it possesses in being an absorber of all miasmatic poisons are virtues which are not recognized in any conspicuous degrees in any other trees. A permanent and great disinfectant like this, which increases its power and efficiency in the ratio of its growth, is of incalculable value to our country.

W. G. Atkinson.

NOTES AND CLIPPINGS.

Ice-Machine. — It is said that an ice-machine has recently been put in operation in New York which will produce ten tons of ice in thirty-six hours. It consists of a large tank in which galvanized sheet-iron boxes are placed, each box being 42 inches long, 12 inches wide, and 6 inches deep. The boxes are filled with pure water and tightly closed. A reservoir containing water charged with chloride of magnesium, and chilled by means of coils through which a gas composed of ether and sulphurous oxide is forced, communicates with the tank, and the magnesium water circulates around the sheet-iron boxes in a continuous current. The temperature of the magnesium water grows lower every time it comes in contact with the coils, but it will not freeze, while the water in the iron boxes is congealed into solid blocks of ice.

Proposed Circular Canal at Milan. — Perhaps no city of Italy has become more greatly benefited by national independence than Milan. Among the schemes of public improvement which are attracting attention is the proposal of Francesco Ajraghi for a canal around the city. The estimated expense is 10,087,766 lire ($2,017,553.00). Among the proposed advantages are: 1, increased facilities for the distribution and storage of commercial products: 2, completion and extension of the system of irrigation; 3, a motive force of 6,281 horse-power, available for manufacturing; 4, increased revenues from local imports of various kinds, from rents and from the sale of city lands; 5, a better and more abundant supply of excellent water for household use and for ornamental fountains; 6, improved sanitary conditions, especially in the suburbs. — *Il Politecnico.*

New Thames Tunnel. — A tunnel has been authorized by Act of Parliament, between Greenwich and Millwall, two districts which have an aggregate population of two hundred and fifty-nine thousand persons. When the ferry-boats are interrupted by the frequent fogs, a detour of about twelve miles has to be made in order to cross by way of London Bridge. The new sub-way, which will be the fourth tunnel beneath the Thames, will be a third of a mile long, approached by a descent of fifteen steps at Millwall and by twenty-four steps at Greenwich. — *L'Ingen. Univ.*

An Ary Schaefer in Danger. — General Garfield, at the instance of Hon. Robert C. Winthrop, called the attention of the House of Representatives to the neglected and dangerous condition of Ary Schaefer's painting of Lafayette. We cannot feel that the painting is out of danger until it is known what the Library Committee, to whom the matter has been referred, decides to do about it.

Miners' Measurement of Water-Power. — A miner's inch of water is a quantity that will flow through an inch aperture with a free discharge, and under a constant pressure of six inches above the top of the opening. An aperture of twelve and a quarter by fifteen and three-quarter inches, under pressure of six inches above the top of the opening, will discharge two hundred inches, and is the basis of all measurements where water is retailed in small quantity in the States of California and Nevada. A miner's inch will discharge a quantity of water equal to twenty-two hundred and fifty cubic feet, or about seventeen thousand gallons, weighing one hundred and thirty-nine thousand five hundred pounds in twenty-four hours. An inch of water (miner's inch), having a grade of four inches to the rod, will carry off in twenty-four hours, a distance of ten miles, ten tons of heavy quartz, sand, and iron. At one gravel-mine in Nevada County, California, twenty-five cubic yards, or forty tons of detritus or tailings, as the waste material is called, are moved from three to fifteen miles every twenty-four hours. One hundred miner's inches of water, conducted through iron pipes and falling three hundred and fifty feet vertically, and applied by means of a nozzle against a hurdy-gurdy wheel sixteen feet in diameter, will furnish sufficient power to run an eighty-stamp mill, beside carrying off all the ore which it has furnished the power to crush. — *Mining Review.*

Japanese Rules of Art. — The Boston *Commonwealth* has discovered among the Japanese the following wise precepts as to art objects: The Japanese are fond of pictures and ornamentation in their dwellings, but they do not, as we do, have a great many things exposed to view at once. One or two pictures, a fungus, and a hanging basket or a bracket serve for a time, when these are laid away, the pictures being rolled up, and their places are supplied by other things. But if a visitor expresses a liking for such things, they will bring out quantities for his inspection. They enjoin the following good rules for looking at a picture: You must not look at it on a dark day, nor a cloudy day, nor when it is so cold that your breath will form a mist before you; nor must you look at it when you are ill, or cross, or unhappy, lest these circumstances influence your opinion. You must not unroll it so as to see the artist's name at first, but study it at leisure, so as to judge impartially of its merits, and who the artist may be.

The Electric Light abroad. — The Jablochkoff system of electric lighting is now in operation, not only in public thoroughfares, but in a great variety of works and private establishments, as well as in those of public resort. It is also in use in the palace of King Theebaw, of Burmah, at Mandalay, where there are sixty lights, and in the palace of Shah Nasser ed Deen, of Persia, at Teheran, where there are four lights. Prince Agaklan has six in his palace at Bombay, and King Dom Luis I. of Portugal, six in his Royal Palace of Casenëo. Queen Isabella of Spain has also six in the conservatory of her residence in Paris. The Paris Municipal Council has renewed for one year the contract for lighting the Avenue de l'Opéra, and Place du Théâtre Français, and the Sous-Secrétaire d'Etat, at the Ministère des Beaux Arts, has authorized the lighting of the *Salon* at the Palais de l'Industrie in June next, on the Jablochkoff system. Altogether the application of this system is quietly extending, and the Metropolitan Board of Works deserve every credit for the part they have taken in developing the question of electric lighting in London. — *Times.*

Catacombs for Warsaw. — The *Kurier Poranny* reports a project which it understands to be under serious consideration for early execution, the object of which is to substitute a row of colossal catacombs for the cemeteries now in use in Warsaw for burying the dead. A design of the proposed vaults has already been prepared. The vaults are, as observed, to be built on a gigantic scale, and to be of sufficient size to hold no less than fifty thousand coffins. It is proposed that each coffin shall be kept in the catacombs only for the space of five years, and shall after that be destroyed by fire, together with its contents.

Artificial Stone. — Artificial stone can be produced by the following process, recently discovered by Ternikoff: A mortar consisting of equal parts of lime and sand is exposed for a few hours to a temperature of 150 degrees centigrade in the presence of water vapor. The paste having been taken out of the furnace is now placed under the cylinders of a machine like that for manufacturing bricks, and it comes out in the form of cubes which, on being exposed to the air, become dry and hard. In the course of eight or nine hours these cubes are as hard as good building stones, and are fit for use. This artificial stone is, in fact, a sort of brick of mortar baked at a low temperature, and the cost, too, is about the same as that of bricks.

Drawing on Photographs. — Mr. Robert Grimshaw, Ph. D., recommends the following procedure, where it is desired to obtain an India-ink drawing from a photograph, without resorting to tracing. Very nice results are obtained thus: Prepare a print in the usual manner. Instead of toning as usual, fix immediately in "hypo." Wash well in running water to get out all the hypo. Draw directly on the print with India-ink. This finished, bleach with a saturated solution of corrosive sublimate (bi-chloride of mercury) in equal parts of water and alcohol. Flowing is better than brushing, for applying the bleach, as it avoids smearing.

An Old Distich. — A writer in *Notes and Queries* says that there yet remains to be seen on a pane of glass at Little Moreton Hall, in England, the following distich, cut with a diamond, and dated 1621: —

> "Man can noe more knowe woman's mind by teares,
> Than by her shadow judge what clothes shee weares."

Packing for Steam-Pipes. — J. Kathe makes a packing, which also may be used as a non-conductor for wrapping the pipes, by grinding twenty parts of hemp-refuse, and mixing it in a Hollander, with forty parts asbestos, twenty parts wool-waste, and twenty parts wood-pulp. The mass is then saturated with soluble glass, and dried. — *Dingler's Journal.*

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BUILDING INTELLIGENCE.

[Reported for The American Architect and Building News].

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

225,385. SERVICE-PIPE BOX. — Eli H. Hummer and Joseph S. Gemmill, York, Penn. This invention relates to cutting off or letting on gas or water to a house. *A*, designates the supply-pipe leading from the main. This pipe extends through a box, B, that, for for convenience of being placed around the pipe, is made of separable parts. C is a spigot, which lets on

Fig. 1.

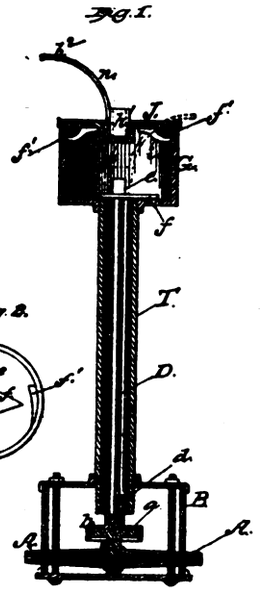
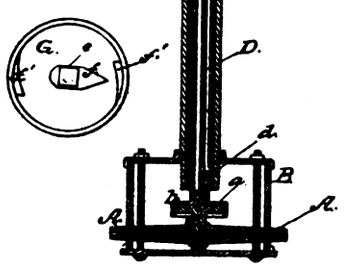
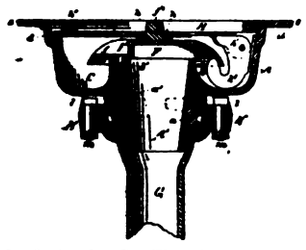


Fig. 2.



and cuts off the supply of gas or water. Extending up from box, B, encircling the rod, D, is a metallic tube, T, the upper end of which opens into a second box, G, sunken into the ground flush with the surface. This tube, T, is usually screwed into B, and extends through the bottom of G. D extends up into G, and terminates in a wrench-seat, *e*, so that it may be turned by a wrench. Upon this rod is a finger, *f*, which indicates the position of the water-way, and whether the water or gas is turned on or off. The box, G, is cylindrical in form, and has upon its inside, near its margin, the oppositely-inclined cams, *f'*, and the lid, J, that closes this box, has lugs, *i*, that engage these cams, and when turned in the proper direction cause the lid to be tightly fastened to the box. This is accomplished very readily by means of the sunken wrench-seat, *g*, in the lid and a wrench, *n*. The upper box is snugly closed, is not liable to collect dust, ice, or snow, and the seat in the lid, being sunken below its level cannot trip up passers-by. Moreover, the operating-rod being a permanent part of the device, and extending through the surface-guard, the attendant is spared the fatigue of carrying the long-stemmed iron implement now in common use for letting on and cutting off water or gas.

226,503. SINK-TRAP. — Edgar W. Anthony, Boston, Mass. *A* is the bowl of the trap, so shaped as to have in its center a boss, B, surrounded by a deep annular groove, C. A dome, F, provided upon its under side with a projection, *f*, fits over the boss, B, and forms a



cover to the drain-pipe G. This dome, F, is fastened firmly upon the edge of the said drain-pipe. There is a free annular space beneath its edge from the annular groove, C, to the drain-pipe, G. The edge of the dome laps over the edge of the boss, B, and thus, when water is standing in the annular groove, C, there is a water-seal between the pipe, G, and the sink. The strainer, H, fits around the pin f^2. Upon the ledge *d*, there are, at three different points, slight elevations, *d'*, which furnish friction-bearings for the edges of the strainer, and prevent it from being raised above the central bearing by the accumulation of grease on the ledge *d*. The lower part of the trap forms the coupling-cone, A', which has two ears on opposite sides, *a*, and around this cone is an annular groove, for the packing or putty. On the lower side of H is a bracket, *h'*, to which is pivoted the hook, h^2, which hooks under the inside of the dome; and the strainer is further provided with a pin, h^3, by which it can be readily revolved; the hook, h^2 being in contact with the walls of the dome, serves as a means to scrape the inside of the dome during its revolution, and thus prevents the passage under it from being clogged with grease. The bottom and edges of this hook, h^2 also come in contact with the bottom of the annular groove, C, and keep it also clean. The drain-pipe, A', of the body of the trap is long enough to extend down into the pipe, G, so as to furnish a proper seal between the two, and is locked into place by revolving the trap under the spiral cams, l^3.

226,387. PACKING FOR STEAM AND WATER-PIPES. — James W. Cameron, New York, N. Y.

226,404. SOLDERING APPARATUS. — John J. Johnson, San Francisco, Cal.

226,406. WINDOW-CORNICE. — Barret W. Kerfoot, Dayton, O.

226,410. PIPE-VISE. — Francis I. Maule, Philadelphia, Pa.

226,440. FLOOR OR WALL-COVERING. — George Palce Chiles, Camden Town, Eng.

226,444. EARTH-AUGUR. — Decatur P. Cudd, Concrete, Texas.

326,449. FIRE-ESCAPE. — Henry Fuller, Franklin, Ohio.

226,461. MANUFACTURE OF ROOFING FABRICS. — William H. Stewart, Brooklyn, N. Y.

226,477. SHINGLE-MACHINE. — Martin A. Bidwell, Sacramento, Ky.

226,478. SAFETY-ATTACHMENT FOR ELEVATORS. — Daniel M. Bissell and Frederick H. Littlefield, Boston, Mass.

226,487. SASH-LOCK. — Eben C. Bryan, Rochester, N. Y.

226,488. SASH-HOLDER. — Eben C. Bryan, Rochester, N. Y.

226,490. WRENCH. — Joseph W. Calex, North Easton, Mass.

226,507. VENTILATOR FOR CHIMNEY-CAPS, &c. — Benjamin W. Felton, Boston, Mass.

226,519. WASH-BASIN TRAP. — Jesse L. Hutchinson, Baltimore, Md.

226,579. VENTILATING WASTE-PIPES. — Richard Wilson, Toledo, Ohio.

226,582. WRENCH. — Ephraim Miller, Spring City, Penn.

9,145. LIGHTNING-ROD COUPLING (*Reissue*). — Elmore C. Bacon, Cleveland, Ohio.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since the last report: —

Adam Pohl, three-st'y brick dwell., 49 Fairmount Ave.

Edward Renneburg, two-st'y brick building, 25' x 47'; cor. Wolf and Washington Sts.

First Colored Baptist Church, cor. McEldery and and Caroline Sts., 52' x 87.

ICE-FACTORY. — A company is forming in this city to manufacture ice. A site has already been selected for the factory, near Calverton, with ample water-power for driving the machinery, and pure water to be converted into ice.

SCHOOL-HOUSES. — Thirteen new school-houses were contracted for by the Baltimore County School Board during the past year, ending September 30, 1879. Seven of these were finished at the date named (September 30, 1879), and now all are completed.

STOCK EXCHANGE. — The question as to whether Baltimore is to have a new stock exchange was definitely settled on the 14th inst., at the morning meeting of the Stock Board, when it was almost unanimously decided to accept the proposition made by a number of members to erect a suitable building if the Exchange would agree to rent it, and it is stated that the new structure will cost $50,000. The site of the building will probably be on German Street, near South, directly in the rear of the National Farmers' and Planters' Bank. The exact plans of the new structure have not been decided on.

Boston.

BUILDING PERMITS. — Since our last report the building permits granted are as follows: —

Brick. — 337-339 *Commonwealth Ave.*, 2 houses, 24' x 62', three stories; A. H. Caton, owner and builder; Kirby & Lewis, architects.

466 *Commercial St.*, for J. Kelly, 1 dwell., 22' x 24', four stories.

375-79 *Marlboro St.*, for G. Wheatlan, Jr., 3 dwells., 23' x 42'. Vinal & Dodge, builders.

86 *Albion St.*, 1 tenement-house, 23' x 45', four stories; J. Graham, owner and builder.

West St., Ward 4, for Middlesex R. R., 1 blacksmith shop, 48' x 123'; M. S. & G. N. Miller, builders.

Wood. — *Washington St.*, Ward 24, for E. Torrey, 1 stable, 33' x 42'; S. Beal, builder; Cabot & Chandler, architects.

Brookside Ave., Ward 23, 1 hat-factory; J. P. Shaw, owner and builder.

FACTORY. — Messrs. Kirby & Lewis, of this city, are architects of a factory on Vale St., Highlands, for the Dennison Manufacturing Company. The building measures 35 by 80 feet, is three stories high, and will cost about $10,000. Jacobs & Son, contractors.

STATE NORMAL ART-BUILDING. — The bill giving a site on the Back Bay to the Normal Art School was engrossed by the Senate, with an amendment providing that the building must be erected thereon in three years, else the land will revert to the State.

Brooklyn.

BUILDING PERMITS. — *Manhattan Ave.*, *No.* 211, 1 three-st'y frame tenement, 25' x 52'; cost, $3,500; owner, William H. Graham, cor. Oakland and Freeman Sts.; architect, F. Weber; builder, Walling & Fenwig.

Hancock St., 6 three-st'y brown-stone dwells., 20' x 43'; cost, each, $6,000; owner, etc., Joseph H. Townsend, 60 Putnam Ave.

Bedford Ave., 7 four-st'y brown-stone flats, 20' x 50'; owner, Geo. W. Brown, 728 Fulton St.; architect, C. B. Sheldon; builders, Levi Brown and C. E. Cozzens.

Clinton Ave., 5 four-st'y brown-stone flats, 20' x 65'; owner, George W. Brown, 728 Fulton St.; architect, C. B. Sheldon; builders, Levi Brown and C. E. Cozzens.

Morton St., 1 three-st'y brick factory, 51'6" x 50'3"; owner, F. H. Cowperthwaite; architect, W. H. Gaylor; builder, James Rodwell.

Ross St., 1 three-st'y brick stable, 22'6" x 46: owner, Edmund McLaughlin; architect, William H. Gaylor; builder, Thomas Gibbons.

First St., cor. South Sixth St., 1 three-st'y brick factory, 98' x 40'; owner, Frederick W. Wurster; architect, W. H. Gaylor; builders, William & Thomas Lamb, Jr.

Park Ave., 4 two-st'y frame dwells., 20' x 40'; owner, etc., Conrad Guthard, 694 Park Ave.

ALTERATIONS. — *Henry St.*, *No.* 547, raise roof, one-st'y extension, 20' x 4'; cost, $1,500; owner, L. J. Elliot, on premises; builder, —— Murphy,

Meeker Ave., No. 38, raise roof, three-sty frame extensions, 24' x 20', tin roof; cost, $1,400; owner, Anton Lang, 38 Meeker Ave.; builders, Sammis & Bedford; mason, J. Auer.

Sixth St., *No.* 253, raise one-half story, three-sty frame extensions, 20' x 7'; cost, $1,200; owner, Frederick Young, 255 Sixth St.; builders, J. Rauth and J. Friess.

PUBLISHING HOUSE. — Mr. C. C. Buck, architect, has just finished plans for a six-st'y building for A. S. Barnes, 71 by 100 feet. It will cost $30,000.

Chicago.

BUILDING PERMITS. — Thomas Mackin, 5 two-st'y dwells., cor. Indiana and Cass. Sts. Cost, $20,000.

Wolf Bros., dry-kiln, 211 North Curtis St.; cost, $2,000.

J. Chanderis, cottage, Ninteenth, near Loomis St.; cost, $2,100.

Bauerle & Stark, dry-kiln, 228 West Ohio St.; cost, $2,000.

Benjamin Allen, two-st'y stone front dwell., Indiana Ave., near Twenty-fifth St.; cost, $9,000.

Weir, Johnson & Co., engine-house, Cologne St., near Ashland Ave.; cost, $2,000.

West Seebert, two-st'y dwell., 3,167 Wentworth Ave.; cost, $2,700.

John Gebrke, 2 twe-st'y dwells., cor. of Wells and Goethe St.; cost, $8,000.

Burr Mission Church, two-st'y church, Wentworth Ave., near Twenty-third St.; cost, $6,000.

New York.

ALTERATIONS. — *Willet St.*, *No.* 22, three-st'y frame store and dwell., to be inclosed by twelve-feet brick walls, etc.; cost, $6,000; owner, Henry Ruh; architect, Julius Boekell; masons, B. Schaff & Son; carpenter, Chas. Lehmann.

West Thirty-eight St., *No.* 1, to be raised to six stories; also a five and six-st'y brick extension, 17' x 49'; cost, $10,000; owner, J. H. Burton, 275 Madison Ave.; architects, D. & J. Jardine.

Wooster St., *Nos.* 36 *and* 38, to be raised to four stories; cost, $2,000; owner, W. Wyans; builders, J. & G. Layton.

East Eighty-first St., *No.* 412, a third story to be added to extension, the building to be extended; cost, $6,000; owner, Martin Clear; architect, Julius Boekell.

Sixty-second St., *No.* 114, to be raised to four stories, and interior alterations; cost, $3,000; owner, D. P. Barker; architect, Geo. W. Walgrove.

Washington Sq., *No.* 1, two-st'y brick extension on University Pl., 42' x 27'; cost, $20,000; owner, C. R. Roberts; architects, Gambrill & Ficken.

Sixth Ave., cor. Thirteenth St., one-st'y brick extension, 25 x 12 feet; cost, $2,000; owner, John A. Oxley; architect, Jas. W. Porter.

Grand St., cor. Wooster, side wall rebuilt and interior alterations; cost, $3,000; owner, W. Wyans; builders, J. & G. Layton.

West St., cor. Albany St., new front and interior alterations; cost, $3,000; owner, Chas. Spear; architect, H. R. Searle.

Commerce Ave., cor. Depot Pl., Highbridgeville, three-st'y frame building to be repaired; cost, $2,690; owners, estate of W. B. Ogden; architect, N. D. Bush; builder, Isaac A. Hopper.

Sixth Ave., *No.* 600, one-st'y brick extension, 24'8½" x 46'; cost, $2,200; owner, Mrs. R. A. Withaus; architects, D. & J. Jardine; builder, Alex. Brown, Jr.

Bentner's Lane, near Riverdale Station, internal alterations and repairs; cost, $7,500; owner, William Meikleham; architect, James Stroud; builder, P. B. McEntyre.

Tenth Ave., two-st'y brick extension, 15'4" x 20'; cost, $2,500; owner, V. K. Stevenson; architects, D. & J. Jardine; builder, Alex. Brown, Jr.

Broadway, *No.* 1214, exterior alterations; cost, $2,400; owner, Henry Bang; architect, Wm. José.

West Tenth St., *No.* 192, to be raised four feet, and a four-st'y brick extension on rear, 21'8" x 37'; cost, $12,000; owner, Mrs. Catharine Cook; architects, Cook & Babb; builders, Robinson & Wallace.

APARTMENT-HOUSE. — Mr. E. T. Littell is drawing plans for an apartment-house, 45' x 100', and four houses 16'6" x 50', to be built on Fifty-fourth St., between Sixth and Seventh Ave. The building will be of brick and stone, with some terra-cotta, and will cost $60,000.

BUILDING PERMITS. — *Lexington Ave.*, cor. Seventy-third St., for James Judge, Thorn & Wilson, architects, 6 brown-stone dwells., 17' x 52'; cost, $51,000.

Sixty-fourth St., for J. Waldron, Thorn & Wilson, architects, 3 brown-stone dwells., 18' and 16' x 60'; cost, $36,000.

Lexington Ave., cor. Seventy-fifth St., for Farley Bros., Thorn & Wilson, architects, Farley & Bros., builders, 6 brown-stone dwells., 17' x 53'; cost, $54,000.

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One Hundred and Thirtieth St., for L. C. M. K. Yost, A. Yost, architect and builder, 2 brown-stone tenements, 25′ x 60′; cost, $16,000.

East Seventy-second St., Nos. 241, 243, 245, for C. H. Bliss, Wm. Grant, architect; Geo. J. Carey, builder; 3 brown-stone dwells., 16′8″ x 50; cost, $18,000.

East Sixteenth St., Nos. 713 *to* 715, for Jno. Koach & Son, Wm. J. Frye, Jr., architect; List & Lemon, builders; brick factory, 165′ x 60′; cost, $20,000.

Stanton St., Nos. 152 *and* 154, for Thos. Rothmann, Julius Boeckel, architect, 2 brick tenements and store; cost, $16,000.

Mercer St., No. 239, for E. H. Bowman, Patrick Childs, builder; brick factory, 25′ x 48′; cost, $1,000.

Madison Ave., cor. Sixty-ninth St., for Anthony Mowbray, Lamb & Wheeler, architects; Anthony Mowbray, builder; 4 dwells., 2 of brick, 2 of brown-stone; cost, $125,000.

FACTORIES. — The plans for the factory corner Duane and Hudson Sts., have been completed by Mr. S. D. Hatch. The building will be 101′3″ x 78′7″, of brick, with granite and Wyoming stone finish, and will cost $150,000. J. H. Masterton will do the mason-work; Jno. Sniffin is the carpenter and Leopold Schepp the owner.

The lot of ground, the site of the recent fire on the corner of Twenty-ninth St. and Sixth Ave., it has been decided, will be used for an extension of the factory of Messrs. Frederick Beck & Co., 100′ x 125′; six stories high, at an estimated cost of $35,000.

HOSPITAL. — Excavations have commenced on the lot corner of Park Avenue and Forty-first Street, on which will be built the Manhattan Island Eye and Ear Hospital. The building will be 98′9″ x 70′, of brick and stone. The style is to be Jacobean. Cost, $100,000. Mr. Charles C. Haight is the architect.

LUNCH-ROOM. — No. 23 New St. is being altered, and a handsome lunch room and bar is being made. All the finish will be of the finest mahogany. Stained glass windows are being prepared by W. J. McPherson, of Boston. Mr. George E. Harding, architect.

"POST BUILDING."—The Post estate propose rebuilding the "Post Building" on Hanover Sq.

REAL ESTATE. — Real estate is firm, and large sales have been made this week, on Tuesday, by order of the Mutual Life Insurance Co.; 236 pieces of property were sold at prices higher than they were expected to realize, and though no "boom" has been experienced, the quiet and steady rise in prices causes a feeling that figures will be well maintained.

STEINWAY HALL. — Messrs. Steinway & Son propose enlarging their concert-hall, which has been found inadequate to hold the audiences at some of the recent concerts.

STORE. — Mr. Myers will have built at the corner of Bowery and Hester St., a store, 53′ x 104′, of brick, with stone finish, the first story to be of iron. Estimated cost, $40,000.

THEATRE. — It is said that the Olympia Theatre is to be rebuilt.

Philadelphia.

ALTERATION. — *Chestnut St., No.* 706, extensive alterations are being made for Passitor, Reed, & Elbridge.

BLIND ASYLUM. — The corner-stone of the new Industrial Home for Blind Women, at Powelton and Saunders Avenues, West Philadelphia, was laid April 15. It will measure 50 by 120 feet, and will be three stories in height. The first story will be built of stone, and the two remaining stories of brick. Cost, $29,000.

BOILER-HOUSE. — *Twenty-second St.*, cor. Penna Ave., 1 boiler-house, 14′ x 36′; owners, Wm. Wood & Co.

FACTORIES. — *Twenty-second St.*, cor. Spring Garden St., five-st'y factory, 78′ x 66′; owners, Wm. Wood & Co.

Fourth St., cor. Lehigh Ave., 1 five-st'y factory, 55′ x 153′; W. H. Bilgen, contractor.

Twenty-first St., cor. Nicholas St., two-st'y factory, 36′ x 62, W. J. Moore, contractor.

Kiernan St., No. 1315, two-st'y factory, 19′ x 55′; owner, J. Raffus; contractor, W. R. Chapman.

Callohill St., No. 1810, 1 two-st'y factory, 16′ x 36′; Lewis Beck, owner and builder.

Kensington St., cor. Elizabeth St., four-st'y factory, 40′ x 155′; owners and builders, John Dallas & Son.

HOUSES. — *Queen St., No.* 2223, three-sty dwell., 20′ x 74′; owner, Morris Flushner; cost, $10,000; architect, Willis G. Hale.

Sunnyside Ave., east of Thirty-fifth St., 8 three-st'y dwells., 16′ x 29′; owners, Keely & Brownback.

Bonviev St., south of Oxford St., 5 three-st'y dwells., 20′ x 56′; owner, Charles Blanchard.

South Broad St., No. 908, 1 three-st'y building, 14′ x 30′; O. S. Tice, contractor.

Bainbridge St., No. 1933, three-st'y dwell., 18′ x 53′; Ernest & Aiken, builders.

Bridge St., No. 124, 1 three-st'y dwell., 26′ x 34′; owner and builder, Geo. Yerricks.

Frankford Ave., Nos. 2825 *and* 2827, 2 two-st'y dwells., 20′ x 68′; J. & E. Blood, owners and builders.

Thirty-fifth St., cor. Alleghany Ave., 7 three-st'y dwells, 15′ x 30′; owner and builder, Samuel Hutchinson.

INSURANCE BUILDING. — In the competition for designs, etc., for the Insurance Company of North America, this city, Messrs. Cabot & Chandler, of Boston, were the successful architects.

STORE. — *Market St., No.* 4032, two-sty store, 17′ x 70′; tractor, John A. Palmer.

Providence, R. I.

ALTERATION. — Howland Hazard is to make a brick addition 21 by 32 feet, to his house on William Street, in the style of the old work, which is Colonial. Work is to done by C. F. & J. M. Hull; architects, Walker & Gould.

HOUSES. — Helen M. Kirby is building a frame dwelling at the corner of Albany and Tell Streets. John Sprague furnishes the plans and does the work. Cost, about $3,000.

Mr. James Russell furnishes the plans, and is building a dwelling on the corner of Almy and Tell Streets for Mr. John J. Breen. Cost, $2,500.

STABLE. — Mr. E. P. Chapin is having plans drawn for a frame stable and billiard-room 40 by 59 feet, at the rear of his house on High St. Work done by the day. Probable cost, $6,000. Architects, Walker & Gould.

STORE. — L. R. Billings is excavating for a block of stores and offices, corner Westminster and Union Streets. Building is to be of brick, stone, and iron, and to cost about $48,000. Masons' work, Geo. W. Lewis; carpenters' work, Richard Hayward. Plans in charge of Mr. Robert Manchester, who is assisted by Messrs. J. C. Bucklin & Son, architects.

TENEMENT HOUSE. — Mr. Ferdinand Potter is building two tenement houses, to cost $3,600 each, corner of Bridgham and Kendall Streets, from plans furnished by Mr. A. N. Parker, who does the carpenters' work also.

St. Louis.

BUILDING PERMITS. — Forty-six permits have been issued for the week ending April 16, 1880, of which seven are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows: —

Owners.	Use.	Stories.	Rooms.	Cost.
C. Moder,	Dwelling.	2	6	$4,500
Mrs. Carrie Marshall,	Dwelling.	2	7	3,400
Mrs. C. Hitchcock,	Store.	1	1	15,000
J. A. Symonds,	Dwelling.	2	7	5,250
Cochran & Co.,	Store.	3	9	3,500
C. Parsons,	Dwelling.	2	8	5,000
Union Depot R. R. Co.	Stable.	1	1	5,000
J. B. Lucas,	Dwelling.	2	14	7,000
M. Keller, agent,	Store.	2	15	5,000

General Notes.

AKRON, O. — Proposals for building the parsonage for the first Universalist Church are received to-day by Jacob Snyder, architect.

BELMONT, MASS. — $25,420 have been contributed to the Massachusetts General Hospital, in Boston, which will be used for building a house for convalescents here.

BRIDGEHAMPTON, N. Y. — Mr. C. C. Buck, architect, of Brooklyn, is to built a house for R. Esterbrook, Jr. Cost, $15,000.

BRYAN, O. — A new school-house is to be built from plans of Mr. N. B. Bacon, architect, of Toledo, O. Cost, $3,000.

CHELSEA, MASS. — The first Congregationalist Society have raised nearly $5,000 to repair the church.

CLAREMONT, N. H. — Mr. H. R. Beckwith, architect, has just finished drawings for houses for J. Knoll, C. E. Parks and A. Tracy.

COLUMBUS, IND. — The Palace Theatre, burned a year or more ago, is being rebuilt.

CONCORD, MASS. — The town has just voted to build a school-house, at a cost of $12,000, and to make alterations in the existing school-houses.

CONEY ISLAND, N. Y. — A new depot is to be built for the New York & Brighton Beach R. R. Dieten Hotel will be utilized in its construction. Mr. George E. Harding, of New York, is the architect.

COOPERSTOWN, N. Y. — A three-story block of good buildings is to be built by Bundy Brothers.

DANVERS, MASS. — Extensive improvements are to be made to the Catholic Church.

DENVER, COL. — E. Anthony, architect, has completed plans for a three-story store, for Jerome S. Riche. Contract awarded to T. C. Kelsey for carpenter-work. Barcus & Carson, brickwork. Cost, $30,000. It is a continuation of the Kassler block, just finished by the same architect at a cost of $50,000.

DETROIT, MICH. — Chas. H. Marsh, architect, is engaged on the plans for the new buildings of the Michigan Grape Sugar Company.

Douglas Smyth, of New York, is drawing plans for a house 50 by 75 feet, to be built on Jefferson Ave., for Mr. H. D. Barnard. The building will be of red brick, with plain stone finish. A little terra-cotta work will be introduced. Cost, estimated at about $10,000.

DUBUQUE, IO. — F. D. Hyde, architect, is preparing plans for a Queen Anne cottage, frame, to be built on Willson Avenue, for C. M. Carter, Esq. Cost, about $2,500. Also plans for a two-story three-house tenement block, brick, for A. Palmer, Esq., to be built on Bluff Street. Cost, about $7,500.

EAU CLAIRE, WIS. — Wallace Hume, architect, of Chicago, has completed the plan of the opera-house for this city, 165 by 105 feet, three stories high. The seating capacity is 1,000; material of building, brick and stone; cost, $10,000.

HICKSVILLE, O. — The architect of the new store for Ainsworth & Co., which is to cost $3,500, is N. B. Bacon, of Toledo, O.

HOLYOKE, MASS. — St. Marie & Beaucheum, will begin to build a three-story block, at the corner of Park and Cabot Streets, as soon as brick can be obtained.

LOUISVILLE, KY. — Annie C. Courtnay is to alter a two-story brick store on Jefferson Street, between Second and Third St. Cost, $1,300.

MANSFIELD, O. — The new opera-house is to be built by D. W. Gibbs & Co., architects, of Toledo, O. Cost, $40,00.

NARRAGANSETT PIER, R. I. — A stone chapel is to be built, at a cost of $10,000, from designs of Mr. J. C. Cady, of New York.

NEWARK, N. J. — The corner-stone of the new House of the Good Shepherd was laid April 18.

NEWTON, MASS. — Ground will soon be broken for a house measuring 45 by 90 feet, which is to be built from the design of G. A. Freeman, Jr., architect.

NORTH LONG BRANCH, N. J. — Two cottages have just been started. The designs are by Mr. E. T. Littell, of New York.

NORWICH, MASS. — Two summer cottages are soon to be built, one for Rev. W. Bacon, the other for Mrs. Kirkland. Mr. S. C. Earle, of Boston, is the architect.

OSWEGO FALLS, N. Y. — The Oswego Falls Manufacturing Company is building fifteen new tenement-houses.

PALMER, MASS. — The New London Northern Railroad is building sheds 375 feet long.

PEORIA, ILL. — Harvey Lattimer is to build a three-story brick house on South Washington Street.

Industrial.

AUBURN, PA. — Miller & Randall will build a new wooden shoe-factory in the summer. It will be 70 feet long, 50 feet wide, and three stories high.

BRADFORD, MASS. — John P. Gilman is building a large hat-factory.

CHICAGO, ILL. — The Crane Brothers Manufacturing Company is to build on Canal Street, with 125 feet on Judd and 50 feet on Wilson Streets, a large manufacturing establishment.

DETROIT, MICH. — A match-factory will probably be built here, in which Hammond, Standish & Co., will be largely interested.

NEW BRIGHTON, PA. — Logan & Strobridge have broken ground for a new foundry and machine-shop.

NEW ENGLAND VILLAGE, MASS. — The Washington Mills Emery Manufacturing Company is about to build a new mill, 30 by 80 feet, three stories high.

J. S. Nelson & Son, are arranging plans for an addition of 60 feet to their shoe manufactory.

NEWTON, N. C. — Ryne & Mehaffy are building a three-run steam flouring-mill.

PAWTUCKET, R. I. — Messrs. Dexter & Clarke are putting up a new mill, 50 by 100 feet, to be used for the manufacture of card-board. Kenyon, Whittaker & Smith are the contractors; cost, $16,000; no architect.

POMEROY, O. — The pulp-mill will be rebuilt at once.

QUINCY, ILL. — The Quincy Paper Company is building a new mill.

ROME, GA. — J. J. Leary is building a large iron-foundry near this city.

THOMASTON, CONN. — The brass-mill extension is under way. Work is also being rapidly pushed upon the Marine Clock shop addition, whose dimensions are 100 by 40 feet.

Bids and Contracts.

BIRMINGHAM, CONN. — The Beardsley Building Company has the contract for the addition to Malley's factory. It is to be of brick and four stories high.

BLACKSTONE, MASS. — The contract for building Mr. W. J. Miller's house has been awarded to Mr. Ichabod Cook, of East Blackstone.

BROOKLYN, N. Y. — The contracts for building the new school-house at the corner of Dean Street, and New York Ave. have been awarded thus: mason-work, Ashfield & Son, $14,242; carpentering, P. F. O'Brien, $13,863; plumbing, M. J. Brien, $900.

The contracts for the new Eastern District Hospital have been awarded.

DOVER, N. H. — H. C. & J. F. Howe, contractors, of Lowell, have been awarded the contract for the four-story mill, 700 by 74 feet, which is to be built here by the Cocheo Mills.

INDIANAPOLIS, IND. — Hon. W. H. English has concluded a contract with J. B. McElfatrick & Son for the construction of his new opera-house. It will be 84 by 228 feet, with a capacity for 3,000 to 4,000 persons. At first it will be seated for 2,200.

PEORIA, ILL. — The contract for building the Ninth District school-building has been let to Valentine Jobst.

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WITH this number of the *American Architect*, the original editor bids his readers good bye. Absence from the country, — it may before a considerable time — will require him to give it up into other hands, though it be not without reluctance and regret. During the four and a half years since this journal was begun, he has seen it grow from a somewhat puny childhood into fairly developed adolescence, with every promise of an active and useful career. He has seen a frank welcome expand into a hearty support. With such a growth there comes the feeling of a cordial relation to his thousands of readers, which he would fain believe they have in some sort shared. Not the least of an editor's rewards is the intercourse which his work makes for him with many who are otherwise unknown, the acquaintance it brings with persons in far-off and unexpected places. There belongs to him especially a pleasure of which probably other persons than he have no idea, a pleasure almost like that of receiving a new and sympathetic member into one's family, — the pleasure of welcoming a new contributor. There are many friends made in this way to whom the present editor has now to offer his word of thanks, and his farewell, while he leaves their impersonal friendship as a heritage to his successors. The *American Architect* owes much gratitude to the contributors, solicited and unsolicited, who have given it credit before the public; to the profession which has accepted it with kindness, and which, the editor would like to believe, sets a value on it as in some degree representative; to the public and the general press, which have met it with a liberal feeling, without too great severity for its shortcomings, and, so far as he knows, with singularly little opposition. For his successors, already known to his readers in their work, if not personally recognized in it, who now take up the charge, relieved of the responsibility of finding shape and character for a new periodical, but with labor and difficulty enough before them in giving it all the completeness which it should have, — for them the editor would bespeak the supporting good will, the reasonable indulgence, and the help that have thus far sustained his journal, at the hands of the readers and contributors, of whom he now gratefully and regretfully takes leave.

HAVING printed last week the new schedule of terms for regulating open competitions adopted by the St. Louis architects, we print this week a circular which is now receiving signatures among the profession in Great Britain, and is to be formally presented, by Mr. George Edmund Street to the Royal Institute of British Architects for their action. As will be seen, the St. Louis architects propose to bind themselves much more strictly than their English brethren, but it seems probable that they have acted wisely in laying down terms so precise and complete that neither unscrupulous designers nor building committees will have much chance of evading them. It is none too soon for some effectual steps to be taken here toward the regulation of architectural competitions. The American Institute of Architects took up the subject at a recent convention, but beyond eliciting some amusing evidence, nothing was accomplished, and the subject was dropped, perhaps with good reason; for the resolutions and recommendations of such a representative body, which in this country would bind only a small part of the profession, do not have in practice so much weight as they deserve. However it may be with the British Institute, which includes a very large part of the profession, the only way in which we can secure an end which all sensible men acknowledge to be desirable, is by the action of local portions of the profession. Where, as is here the case, only a minority of the architects in a given place are members of the national organization, it is impossible to require that small minority to put themselves on a different footing in regard to their business from their professional rivals — many of them perhaps as eminent as themselves — by signing a schedule of terms, however wise; while, if all the reputable architects of a given locality agree to keep to certain stipulations, their point is gained at once, though there remains a possibility that outside architects, not bound either by similar agreements entered into at home or by a sense of honor, may try to intrude themselves by offering to compete on less favorable terms. If the rest of the profession will take advantage of the courage of the St. Louis architects, and follow their lead at once, they have an opportunity of putting themselves in a position far more respectable than the one they now occupy before the public, who cannot always conceal a lurking contempt for an eccentric profession whose members beset them with offers of gratuitous service for which they would willingly pay.

THE St. Louis schedule printed last week bears the names of twenty-seven signers, and is in most respects a fair and well-considered body of rules, although in one or two places it draws the line harder and faster than is desirable in a document of so wide a range. A few points seem to us particularly worthy of attention. One point of which clients are naturally negligent is covered by claiming not only time enough for preparing and perfecting a design, but some allowance for the ordinary occupation of competitors. It reminds those who may invite designs that an architect's drawings are his own private property unless paid for, in which case they are for the sole use of his client, but that the actual drawings still always belong to the architect who made them. This asserts a claim which is of great importance to the profession, but which the carelessness or want of nerve of the feebler practitioners has given too many occasions for disputing. The schedule also requires the explicit understanding that in case the building is erected after any of the designs submitted in competition, it shall be given in charge of the author of the first premiated design, who is to be employed at the usual compensation, and claims that the premiums shall be awarded under all circumstances for the designs which may have been admitted in competition. Another of the terms demands that one of the jury of award shall be an architect; and that no one shall be a juror who submits a design, or is in any way interested in the execution of the work. Any design is to be excluded which deviates from the instructions, or the cost of which will, in the opinion of the expert, exceed by ten per cent the allotted sum. Perspectives must be excluded unless expressly called for in the instructions, and if called for must be drawn to the scale of the elevations, with the picture-plane passing through the nearest corner of the building; and no more drawings must be called for than will clearly explain the design.

THE provision, copied we believe from an English scheme, that any design shall be excluded if it is declared to exceed by ten per cent the allotted cost, is one that seems to us overstrained. A disregard of the limit of cost leads to great abuses, certainly; but we do not think they are to be overcome in such an off-hand way. Its reasonable purpose is to prevent some architects from getting an advantage over more scrupulous competitors, by outshining them, with disregard of cost. But if the limit of cost is to be insisted on rigorously, we need something more decisive than the comparative estimate of an expert, at least unless the plans and specifications are made out minutely enough for a contract: to do this is to make competitions the unreasonable and unnecessary burdens against which architects are protesting, and against which the first of the regulations is specially directed. For practicable competition, the limit is much too close. Such a condition would not be applied in ordinary cases, and if it were, would breed more dissatisfaction than it would cure. Moreover, while one design might be ruined by paring off ten per cent from its cost, another may bear the reduction without serious injury. If a

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design cannot be cut down to the required limit without sacrificing its character, it is unfair to give it preference over others which have been restrained by that limit; but it might also be unfair to a client to require him to give up a design which could be cut down ten per cent without losing the qualities which made it attractive to him. It is as impossible to allow for all cases in a short discussion as in the schedule; and there are some cases in which a very close adherence to limit is necessary; but such cases demand a very rigorous and elaborate competition, which should be paid for accordingly. A committee is apt to need instruction in the matter of cost, as much as in other matters. The common mistake, we are convinced, is quite as much in attempting to fix an exact limit of cost, as in doing violence to it when it is fixed, and it would often be a more reasonable way, — especially when elaborate plans are not required — to make the cost simply recommendatory, and allow architects to take their chance with that as with the other points of their designs; or else to allow a considerably larger margin than ten per cent. The question is, in fact, too difficult and too various to be dealt with very summarily in the gross.

The signers of the paper agree to the terms of this schedule, in the same manner as to the schedule of charges, a copy of which is appended to the document. It is encouraging to see signs that our profession means to hold its head up in the world, the more so when the signs appear in a part of the world where the newness of the profession makes special effort necessary to command its position; and if this schedule shall be generally imitated, we will answer for it that both architecture and architects will deserve and receive increased respect from the public at large. The St. Louis architects have deserved well of the profession in taking this stand. We trust they will be able to maintain it, and would most strongly urge upon their brethren in other parts of the country the importance of acting with them. If their lead is immediately followed, their hands will be strengthened, and all will receive the benefit of their courage. If the apathy of the rest of the profession allows their single-handed effort to fail, the precedent of defeat will have an influence for years to come.

The sad accident at the Madison Square Garden in New York, of which the news reached us just as we were going to press last week, continues to occupy largely public attention, and, thanks to the activity of New York reporters, we are enabled to gather a pretty full account of the circumstances, from which each one is at liberty to form his own theory of the cause of the catastrophe. The building is, briefly, a parallelogram two hundred feet wide by four hundred and twenty-five long, enclosed by twelve-inch brick walls, twenty-eight feet high. On the Madison Avenue side of the structure a portion had been partitioned off, by timber frame-work, as we understand, enclosing a space forty by two hundred feet, open from end to end, without any cross partitions whatever, and half way up the wall a floor was inserted, dividing the height into two stories. Posts were set up against the brick wall forming the Madison Avenue side, corresponding to the posts in the framing of the opposite wall, and cross girders supported on these posts carried the floor, independent of the wall, which, however, was anchored to it. On another tier of posts on each side rested the roof-trusses, which were of ordinary construction, low in pitch, and covered with boarding, and tar-and-gravel composition. On the occasion of the fair a light partition separated the upper story into two rooms, one of which was used for an art-gallery, and the other for a ball-room. Forty couples were in the ball-room, and fifty-four persons in the gallery, when almost without warning, a portion of the upper half of the brick wall fell outward into Madison Avenue, beginning at the centre, over the main entrance, and extending to the north-west corner of the building, and carrying the roof with it.

The wall appears to have been sufficiently well built, and the trusses, if the other members corresponded with the size of the tie-beams, which are said to have been six by eight inches, would seem, provided they were not too far apart, to have been of sufficient though not excessive strength for a span of forty feet, supported as they were by a good system of bracing. The explanation offered by the Department of Buildings, and by the experts summoned on the coroner's jury, is that the tie-beam of a truss near the middle of the building parted, letting the truss fall, and the thrust of the falling rafters pushed out the wall. In support of this theory Superintendent Dudley points out that one truss was found with the tie-beam broken at a large knot, and he considers the existence of such a defect, which might have been overlooked by contractors or inspectors at the time the structure was erected, sufficient reason for the accident, especially if, as he thinks possible, the heat from the gas-jets in the art-gallery had warped the timber badly. This explanation is improved upon by the contractors for the masonwork, who consider the heating of the timbers the main cause, and lay the catastrophe to the account of the managers of the fair, who should not have allowed so many gas-lights; in fact, should not have used the room for a picture-gallery at all, as it was never designed for that purpose. The contractors for the carpenter-work cannot see how the heat of a room should have such fatal effects on the strength of timbers in the roof above, but they also charge the accident upon the managers of the fair, who they say, should never have allowed dancing in a room not designed for that purpose. Dancing, they say, is one of the worst strains that can be put upon a building, and the vibration probably weakened the roof-timbers until they gave way. In fact, all parties seem to be agreed that the officers of the fair are in some way to blame for the disaster.

It is very difficult to judge with certainty in such cases, but with all due regard for Mr. Dudley, the Superintendent of Buildings, we can hardly give much respect to his explanation. That any conceivable knot in a wooden tie-beam should rob it of the comparatively small amount of tensile strength required would be a very strange circumstance. Still stranger would be a degree of warping which should give rise to so sudden a failure. We should expect in such a case that the broken timbers would protrude through the ceiling long before the gradual sinking of the rafters would spread the walls to a fatal extent, but all accounts agree that beyond the falling of plaster in small pieces, no bulging or other disturbance was observed in the ceiling: on the contrary, the collapse of the wall was the first phenomenon noticed. Another point, which is brought forward in the account of one witness, points to a more probable explanation of the disaster. This was a leaning of the wall, to an extent of about four inches from the vertical, which is said to have been observed that morning. It will, we think, be agreed by most architects that a twelve-inch brick wall two hundred feet long, without buttresses or cross partitions, approached the verge of safety, even though only twenty-eight feet high. If the timber frame-work behind it had been well braced together horizontally, it would have formed a stable structure, to which the wall could have been safely anchored; but we see no evidence of this, and such anchoring as existed would not prevent the timber posts and girder of the middle portion from communicating their movement, which would be greatest at that point, to the masonry, and so perhaps fatally increasing the natural tendency of so long a wall to bend over midway between the ends.

A proposition has been made in Cleveland to introduce into that city the compulsory use of a device which is already prescribed by law in Chicago, to prevent the setting of fires by sparks from a chimney flue passing through the joints of the brickwork, and coming in contact with wood. This device is familiar in Europe, and consists simply in building into the flue a number of short fire-clay tubes, usually rectangular in section, with the corners rounded, and jointed with a little mortar, so that they form a continuous pipe to the top of the chimney. It must be acknowledged that our present modes of flue building are very defective. Four inches of brickwork is none too thick a wall to keep the fatal flames within bounds; it is not enough when, as we continually see, trimmer-beams and furrings are placed in contact with the bricks. Many a house can show beams and studs charred black by such contact. The plastering, or pargetting, of the inside of the flue is also but a feeble defence; the lining soon cracks and falls into the chimney, dragging with it the mortar from between the bricks, so that the ultimate state of the flue is worse than if no pargetting had been attempted; and even if the plaster stays in place, the pyroligneous acid of wood-smoke acts with great violence upon it, so that it is eaten out of the masonry in time. It is not surprising, then, that a large proportion of house chimneys have unobstructed openings between the interior of the flue and the woodwork outside, and it is simply a question of chance how soon a spark will stray through. Against this danger the fire-clay pipes offer perfect protection; their cost is not great, and their general use would greatly lengthen the average life of buildings.

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VENTILATION OF BUILDINGS.[1] — III.

IN my last lecture I attempted to show the need of ventilation, the quantity of work to be done, *i. e.*, of air to be moved, and some of the difficulties and complications arising in effecting the purpose. I will now describe some of the methods pursued in accomplishing this work, and how they may best be adapted to the ends in view.

Three distinct methods for moving the air within the building are in use: —

1st, By *perflation*, — *i. e.*, opening doors and windows, and allowing the wind to blow through the building. This method is of course limited to mild weather, or in cold weather to short periods of flushing, as in bed-rooms, after leaving them in the morning.

2d, By the application of heat to move vertical columns of air in chimneys and pipes, by help of the greater specific gravity of the air outside of such pipes, etc., aided by wind.

3d, By mechanical force applied through rotary fans or blowers of any kind.

This last is sometimes called artificial ventilation, from the sole reliance upon motor machines of some sort. This power or force is generally applied in the form of compression, *i. e.*, by pushing the air along forcibly, while the second method is more akin to a process of exhaustion, the heated column being in a flue called an "aspirator." Yet, strictly speaking, the motive force here is gravity, and the upward movement is really produced by the excess of pressure through the bottom of the flue from the weight of air outside, as compared with the pressure through the top of the flue. The latter includes the lighter air and gas inside, and therefore fails to balance the outside column.

Taking up these methods in the order above named, —

The process of *perflation*, though limited as I have said, is by no means to be ignored. All buildings in warm climates, and dwelling-houses everywhere, should be so planned as to take advantage, as far as possible, of this cheap method of changing the air.

In dwelling-houses within densely peopled cities, the temptation to neglect this means is the greatest, for it becomes a question of cost. The compactness of city houses, when in continuous blocks, renders frontage valuable, and a majority of such houses have less than one-half their perimeter exposed to the air. Yet many devices may be resorted to by the architect to increase this perimeter by offsets and projections, such as have now become so common, beginning with the old-fashioned "swell-fronts" and blossoming out to-day in a great variety of oriels and niches. It enables us to invite every wind of heaven within our walls at pleasure. Such a development is also susceptible of æsthetic treatment, and is to be encouraged for that reason also. The extreme development of such an outline is seen in the modern field fortification, which by its re-entering angles and bastions is ready to receive the enemy in every possible direction. For the same reason it gives the best chance for a friend to get in, if not resisted by gates, moats and glacis — *vi et armis*.

But besides the exterior outline, the inside arrangements of a house should conform to the need of a direct access to the winds. In country houses the problem is simple enough, but in cities there is a constant pressure to avoid *cost* by devoting a large space in the interior, half way from front to rear, to various purposes which demand more fresh air than they often get. The result is generally an entire abandonment of *perflation* in this region, and the substitution of inefficient devices for aspiration. This is one of the greatest evils of a modern city house, and an argument of no small force in favor of spreading out the domicile in stratified "flats," on the French method, so that each house can have its outside exposure better arranged for the access of fresh air than if built on a ground plan of 18 by 80 feet, and five stories high. On the other hand, the "flat" system exposes a family to the unpleasant cooking, or other, smells evolved by the family or families below them, which may be a worse evil than the one before alluded to. The parts of a house which should be best provided with outer air at will, are the sleeping-rooms, bath-rooms, and kitchens. The modern habit places the kitchen at the bottom of the pile, almost buried in the ground, and sometimes with so little light that gas must be used for a good part of the day. The result is that it becomes next to impossible to exclude the fumes of the cooking, and as a large number of houses have no device whatever for carrying these off, or an inadequate one at best, one can hardly enter a city house on a winter afternoon without becoming aware, with the first breath, of all the most prominent dishes that are to be served for dinner. Such houses do not lose the odor of one dinner before the next is in progress, and the result is an accumulation in all the carpets, upholstery, and even in the blankets and wall-papers, of a nondescript odor of past cookery. The odors of food are very good things when fresh and in their places, but quite otherwise when thus become stale and hoarded up in one's furniture.

The kitchen should and generally can be located in a projection at the rear, so that two sides at least can have light and air from the outside, and should be isolated as far as practicable from all communication by air draughts with the rest of the house, through dumb-waiter shafts, stair-wells and passages. Where this projection is difficult or impracticable the most ample provision should be made for carrying off the fumes by a large and separate flue in the chimney, devoted *exclusively* to the purpose all the way up.

I have been called upon this very week to apply relief to a housekeeper whose chamber was invaded early every morning by the dense odors preliminary to breakfast. I found a large flue opening over the kitchen fire, well arranged for relieving the kitchen, but as the *same* flue had an opening in the lady's chamber, above which the flue was partly obstructed, the result was the ventilation of the kitchen into the chamber by a very efficient draught.

The bath-rooms and water-closets too should, wherever practicable, be so located as to get access to fresh air; but as this is rarely possible in the city, except at a large cost for ground-room, other devices are generally resorted to, instead of perflation, for changing the air in these apartments. As the sleeping-rooms are generally used only for the night, time can more easily be taken to get the wind through them than in the kitchens; but whenever located in the *interior*, and removed from the outside walls, the doors and openings should be so arranged opposite one another as to make it easy to get a draught through them at will.

In the planning of hospitals, halls for assembly, court-rooms, and other public buildings, particularly when to be used in mild weather, regard should be had to establishing these through currents, and in such a way that the draughts may be under control, as to the height above the floor. The warmest weather, with moist air, such as prevails near the seacoast for many days in summer and sometimes with but very little wind, requires the currents near the floor, and if the windows are all high we suffer for lack of the refreshment that a perceptible draught would give us; but in cooler or dryer weather we may need *some* air, but directed upward, so the draught may not be so perceptible. Tilting shutters above windows, or tilting sashes, hinged at the bottom, and held at different angles at will, are used with much success at such times for public buildings.

It is very important that ample openings should be provided for the escape of vitiated air from near the top of rooms where it accumulates, as I have explained. Many business offices, factories and public buildings have windows that do not extend within several feet of the ceiling. Although these windows may be made to open at the top, as all windows should, there will still be a reservoir of foul air above them which it is very difficult to remove, and which renders all efforts to change the air unavailing without a high wind to help us in doing so.

A simple piece of apparatus is used on all sea-going vessels, particularly steamships, called the wind-sail, by means of which the fresh air is forced down a vertical pipe into the hold by an open funnel or bell-mouth at the top, kept always facing the wind. Such a device, or a modification of it, with a vane attached, might often be of use to force air into the inner regions of many large buildings, at times when the sultry condition of the weather renders some special effort worth while in this direction.

With a proper regard for the considerations here referred to, the method of perflation is all that is needed for the ventilation of most buildings in this climate during several months of the year, and for the whole year in tropical climates. In hospitals and other large establishments where fresh air is of great importance, the other methods, which are generally provided for the cooler months, can generally be called into activity upon any emergency during the summer when the need is felt.

An excellent method of admitting a slight current of fresh air in a sleeping-room, even in winter, is to provide a bit of board about two inches square and the same length as the width of the sash. By shutting the bottom sash on to this piece, we leave a space between the meeting-rails where the air enters and is deflected upward by the glass, so that no draught is felt. The law of diffusion of gases is a great help in ventilating sleeping-rooms.

Hartley gives the following instance, showing the amount of work done by the combined effect of diffusion and leakage through cracks, etc.:

"A bed-room $12\frac{1}{2} \times 12\frac{1}{2} \times 10$ feet high, net contents 1,500 cubic feet, with a dressing-room on one side of 560 cubic feet capacity, and two walls against the open air. The windows and doors were all shut, but the chimney open. One person occupied the room for nine hours. It was found the CO_2 had increased one part in ten thousand. Taking the exhaled CO_2 at 5.4 cubic feet for the nine hours, the change effected was equivalent to 54,000 cubic feet, changing the whole contents of the room every fifteen minutes, if nothing is allowed for diffusion."

This goes far towards indicating the power of natural methods of ventilation in private houses, where the exposed surfaces are quite large in comparison with the number of persons occupying the house. But it is not applicable to rooms in the interior of buildings, nor to those which are occupied by many people.

The second method (by means of heated columns of air) is the one generally used for all weather that requires the windows to be closed, both in dwelling-houses and public buildings.

A great variety of conditions are here met with, which complicate the case and call for special attention. Economy and convenience both point to the plan of using the heat required for the comfort of those occupying the building as a motor to do the work of changing the air, and this can generally be managed with success in dwelling-houses, school-houses, hotels, and most buildings used for commercial purposes. But the penurious character of many builders, with the great lack of information and attention to the subject, have produced a result very various and unsatisfactory. For rooms in dwelling-houses where chimney openings can be provided and where there

[1] A lecture by Mr. Edward S. Philbrick, C. E., delivered before the students of the Massachusetts Institute of Technology.

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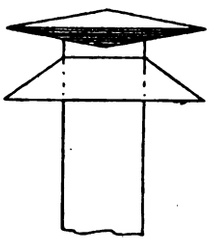
are one or more sides of the room having openings to the outer air, no further provision is generally needed, provided always that the gas-burners, if many are used, have special vent-pipes. But in city houses that have bath-rooms and water-closets remote from the outer walls, some special provision is generally needed. The interior of such houses is generally provided with a sky-light well, which can be used for an up-cast shaft to deliver air through the roof. If the top of this shaft is provided with a ventilating cowl, of which the common truncated cone, surmounted by a double conical cap (Fig. 1), is a good type, we can get a tolerable draught in windy weather or while the house is artificially heated, but during damp sultry weather, precisely when most needed, the pipe is quite inert. Although such appliances are generally worth while, and may do much good, it is also advisable to call in the aid of the kitchen-chimney flue, which is rarely without a fire even in summer, the heat of which can be used to create a draught. A common method, and a mistaken one, is to pierce the fire flue with a metal pipe for this purpose. If this pipe is large enough to do any real service, say six to eight inches diameter, it will be likely to spoil the fire draught. So the better way is to build a round pipe into the chimney, of cast-iron, eight inches or more diameter, exposed to the heat of the fire flue, and extending quite to the top. Branches can be led off from this, of tin or galvanized-iron pipe, to the bath-rooms and water-closet seats, urinals, etc., taking care that the sizes of these pipes diminish as they ramify, like the roots of a tree: otherwise those nearest the chimney will be the only ones to get a draught, or the reverse. This ventilation-pipe should never on any account be connected with any drain, waste, or soil pipe, the vents of which ought *never to enter any chimney.* I have applied this system to some old houses with excellent results, though it is much easier to apply it when they are built.

FIG. 1



When providing up-cast shafts for removing air from public buildings, special apparatus must be constructed and often furnished with special heating by steam-coils or otherwise. When working on such a large scale it is necessary to compute the proper capacity of the apparatus in proportion to the amount of work to be done. Let us then investigate the cause for the upward motion of heated air, and ascertain how great a force we have to depend upon.

The motive force is gravity, acting by means of the greater weight of the air outside, compared to the weight inside the shaft. We have a normal pressure outside of some 14.6 lbs. per square inch, tending to force air in at the base of the shaft. If the temperature inside were the same as outside, this pressure would be exactly balanced by that coming down through the top of the shaft, and no motion would result. If the inside air be heated, the pressure at the base through the top would be thereby diminished to the extent of the difference in weight of the heated column as compared with the air outside.

Now air expands about $\frac{1}{490}$ of its volume for every degree, Fahrenheit, additional temperature. So if we have a shaft forty feet high, and heat it fifteen degrees hotter than the outside air, the air inside would lose in weight by an amount represented by a column $40 \times \frac{15}{490} = 1.224$ feet high. The velocity with which the outside column would try to get in at any orifice at the base of the shaft would be governed by the same law as that of a body falling through the space of this excess of height. Now the formula for the velocity of falling bodies is $V = \sqrt{2\,g\,h}$, where h represents the height or space through which the fall is made, and g the force of gravity or the velocity at the end of the first second. This force at this latitude is about 32. Substituting this value for g, and the value 1.224 for h in the above general formula, we have: —

$$V = \sqrt{64 \times 1.2\,24} = 8\sqrt{1.224} = 8.848 \text{ feet per second.}$$

This is the theoretical velocity. We must then make such allowance for friction as circumstances demand.

The co-efficient of friction is seldom less than 0.5 to 0.3; but the friction is largely increased by the roughness, length, the crooks, or other disadvantages of the pipe.

The product of the velocity by the sectional area of the flue will of course give the volume of discharge.

In making all such computations we have some elements of uncertainty, — first, in the actual heat of the rising column, as it can be maintained; and second, the coefficient of friction, which in small flues is quite uncertain.

Since the introduction of fresh air in cold climates demands artificial heating, the hot air so introduced is generally buoyant enough to find its own way out of the building when vitiated, if a path is given it. In dwelling-houses and all buildings where no large numbers of people gather, the heating apparatus generally gives all the motive power that is needed to change the air during the period when the weather requires the windows and doors to be closed. But care must be taken to so adjust the influx of warm fresh air and the efflux of the vitiated air as to accomplish the purpose intended, and in a way not to produce disagreeable draughts. In the first place the air should be taken from a place where it is not liable to be contaminated. A too frequent practice is to supply it from the back yard, close to the ground, often within a few feet of a cesspool with grated cover, or unsavory heaps of rubbish that are apt to collect in such places. Dr. Angus Smith says, "Disease crawls along the ground." The cold-air duct should always terminate, in cities, some six feet or more above the surface, and it is much better to have it debouch on the north or north-west side of a building in this climate, so as to receive the winds that prevail here in extreme weather. It is found difficult to make air move in such ducts *against* the direction of a strong wind, and it is not an uncommon thing to find the air-current inverted if the inlet faces the leeward side of the house. It is found to pass down from the rooms on the windward side of the house, supplied from cracks or cold chimney-flues, and thence through the heating apparatus into the street or back yard! Not only is much heat wasted in this way, but great risk of fire incurred by forcing heated air through wooden boxes intended only for cold air. Another very common mistake is made by placing the cold-air ducts in sub-basement spaces almost inaccessible for inspection. They should be accessible through their whole length, and for this reason it is much better to keep them above the basement floor, and construct them of galvanized-iron rather than wood. I have during this month inspected a house near this building, one of a block of fine stone fronts, where the cold-air duct was made of brick sides and rough board covering, the bricks being laid directly on the ground under the basement floor. The rats had honeycombed the sand beneath it in great numbers, apparently nesting there, and stowing away their hoards of garbage. A drain-pipe suspended to the floor near by had a leaky joint, from bad workmanship, so the foul air from the drain circulated freely, and was drawn into the cold-air duct through its numerous rat-holes and cracks in the covering, to be warmed and distributed all over the house. A man had recently died in one of the chambers with typhoid fever, but the owner seemed loath to believe that the house was not in perfect order.

I was recently consulted by the owner of a house on Beacon Street, as to the position of his cold-air duct. It was located, as usual, under the basement floor, and though comparatively tight, was subject to the percolation of ground-water which stood in pools in it whenever the ground was saturated by rains. An examination of this water showed it to contain considerable quantities of sulphuretted hydrogen, arising from soil pollution in some form or another. The air-duct was abandoned and replaced by a galvanized-iron one suspended to the kitchen ceiling, made double to avoid the condensation and drip of moisture on the outside.

PORTLAND CEMENT.[1] — IV.

DISCUSSION CONTINUED.

Mr. Henry Sharp (Bourne Valley Pottery and Concrete Tube Works, Poole). — The tensile test at seven days, the tests for fineness and for weight, are useful as being the earliest that can be made, and as affording to some extent useful information, but the test which from a consumer's point of view I rely on is the tensile strength of a mortar or concrete twenty-eight days old. This mortar should be, in my opinion, gauged one of cement to three of clean sharp sand. These are the proportions adopted in Germany as a standard, and the minimum breaking strain is fixed at 105 lbs. per square inch section. This, however, is absurdly low, and one well-known German firm of cement-manufacturers offer me cement which they guarantee to produce a mortar breaking at not less than 284 lbs. per square inch at twenty-eight days, the gauging being one to three. At my works the cement we use is subjected to a similar test, but as a rule gives considerably higher results. The mixture is a concrete rather than a mortar, the briquettes being samples of the pipe mixture taken daily as it comes from the mixing-machine. We are not satisfied with less than 350 lbs. at twenty-eight days, and we find that with well-ground cement, and carefully proportioned aggregates, our briquettes will sustain even 400 lbs. and upwards at this age, those made from the German cement before mentioned being among the highest. Cement-manufacturers may reasonably say that they cannot allow the reputation of their cement to depend upon what consumers choose to mix with it, and I willingly admit that our concrete test briquettes are not mixed with mathematical accuracy such as would obtain in a laboratory, our object being to ascertain the strength of the material that is being made into a pipe. We however are able to quote these tests to manufacturers who supply us, because they are aware of the care we give to the subject — indeed, the results we obtain are evidence of this fact. Hence it is of no use for manufacturers to tell us that their cement gauged neat breaks at 600 lbs. at seven days (which figure, by the way, I have never been able to reach with *any* cement) if we find that our concrete made with it does not touch 250 lbs. at twenty-eight days. The value of a cement to the consumer consists in the amount of aggregate it will carry, retaining the requisite strength; and to ascertain this there can be no simpler test than the above. If the breaking strain, the appearance of the briquette and of its fracture are satisfactory at the age of twenty-eight days, it is quite certain that the concrete has nothing but a future of increasing strength before it. The only objection that I can see to this test becoming a standard one is that which, as I have already hinted, would be raised by the manufacturers of cement. If Mr. Faija is able to provide the an-

[1] A paper by Mr. Henry Faija, Associate M. Inst. C. E., read before the Royal Institute of British Architects, February 3, 1880.

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swer to this objection I feel sure that such a recognized system of testing would often be found of very practical value to both buyer and seller, and of course there are cases where an independent chemical analysis may be required by one party or the other.

PROFESSOR LEWIS, F. S. A., *Vice-President.* — The subject which Mr. Faija has brought before us is by no means new to him, and I remember well a lecture which he gave some years ago upon it, when the well-known engineer, Mr. Bramwell, was in the chair. But we must bear in mind, in considering the whole subject, the very valuable experiments carried on for a series of years by Mr. Grant, of the Engineer's Department, Metropolitan Board of Works. It seems to me that tensile strength is really of comparatively little use to us unless it bears some direct proportion to that of the crushing and shearing strength. In actual practice, the weight which is put upon it acts directly as a crushing force, or, as in the case of a settlement, either as a shearing or bending force, — the question being in the latter case whether it would have such a degree of elasticity as to allow even the slightest settlement to take place without breaking the cement. I think that Professor Kennedy's experiments on this question are very interesting. They supply a want which we have felt, and unless the tensile strength has a definite relation to the crushing and shearing, the tensile may or may not show a good cement, but it is not a sufficient test for use. Another point likewise which Professor Kennedy has investigated is the difference of strength between the briquettes when the cement is simply poured into them in the usual way and when they are subjected to the crushing force. Of course in actual work a bricklayer puts on a layer of cement which receives the weight of brick or stone upon it at once. It is thus pressed directly by a heavy weight until the cement is set, and, therefore, to test the strength of the cement without the pressure upon it, is to test it in a way in which it is not used in actual buildings. For many years I have been carrying on a series of microscopic observations on the way in which cements and limes of all kinds set. I need not explain in this room the theories about the setting of mortars and cement, but the precise way in which the setting takes place was not investigated, I think, by Mr. Grant, and is still a subject not clearly known. I began the investigation some nine years ago under very favorable circumstances, that is, in a house in North Wales with a northerly aspect, and it was with a microscopic power of 110 diameters. I will allude now to Portland cement only, which I tried at first in its dry powdered state. Before it was put in, it had a perfectly uniform gray tint; under the microscope it resolved itself at once into very minute brownish-white specks lying upon a substratum of a black vitrified mass. I was puzzled at that, and of course the first thing was to know what that vitrified mass was. I sifted it through first of all the 50 sieve, that is the 2,500. The appearance was just the same; I saw these brownish-white specks exactly as before on the black substratum. I then passed the powder through another sieve, a great deal finer than anything you have seen to-night, having 14,400 perforations to the square inch. The cement was not a selected sample, but was taken at random from some used in a building which was being carried out under my direction, yet a large portion of the cement passed through the 14,400 sieve, and I had still the white specks and the black substratum. I separated them at last by dropping the cement gently into water, and then before it had time to set I poured out the lighter portion, mixed the residuum again with water, and so on until I got a deposit nearly black. Unfortunately I had to give up the investigation, and I have not had this dark deposit analyzed. My own impression is that the lime in the cement was not chemically combined with the clay, and that, therefore, I had got the strongly-burnt clay separated from the lime. But I have Mr. Faija's authority for saying that he has had that investigated, and that the lime and clay are chemically combined. I afterwards tried Portland cement mixed with water and very fine washed sand — one of cement and two of sand pressed down. The microscope resolved this into a loose mass of sand grains, with a very large proportion indeed of spaces in between. On each grain of sand minute granules of brownish-white (evidently the cement) were scattered. The cement when fairly set gave no appearance of a pasty mass filling up the places between the sand grains, but presented the same appearance as at first, except that it had turned them quite white, the white granules being scattered over the sand, and the only parts in which they could be connected were where the grains of sand joined and where the little granular specks upon them likewise of course joined. A number of very curious results which I found, not only in regard to cement but of mortars, etc., might be interesting, and I may hereafter complete my investigations and bring them before you in a more definite form. Possibly these few remarks, though of no great practical use, may induce some to investigate the subject of the setting of cement in a different way from that which has usually been tried.

THE PRESIDENT. — It occurred to me before this paper was read, that possibly the subject matter might have ramified to a larger extent than it has. Able as no doubt the paper is, it is confined very much within the limits of the testing power of cement; whereas to architects the use of cement and plaster presents broad and pleasant features. I think, however, that within the limits the reader has assigned himself he has treated his subject ably and well, and that the discussion has been practical and useful. The suggestion made by Professor Kennedy is one that should have due consideration on our part; and it would be of very great utility, supposing that we were able to see our way to do it in conjunction with the Council of the Institution of Civil Engineers, to establish a standard method of testing cement. I quite agree with Professor Kerr, who, I think, made the remark that anything like the elaborate calculations and experiments suggested in the paper would be impracticable in the majority of the works with which we architects have to do. Great and important as the tensile strength of the material may be, equally important is the manipulation of the material: and if the writer of a future paper on Portland cement could define a rule by which we could frame a specification that would describe the use of cement when in its very best form, and avoid those miscalculations arising from bad manipulation, the use of bad cement, the undue quantity of water with it, and matters of that kind — he would render a great practical service to the majority of the members of our body.

HENRY FAIJA, Assoc. M. Inst. C. E. — I have to thank you very much for your kind reception of the paper, and I am glad that Professor Kennedy agrees with me in the experiments he has made in respect to the non-setting powers of the core of a cement. It is a question which I believe has been disputed by many people, and which I have tried to make perfectly clear, and when I have Professor Kennedy on my side I am quite sure that I am right. As an additional proof I gauged a small pat yesterday, and it is now perfectly set and hard; it is made from some core which had previously been mixed up with water. Now, as cement will not set twice, if the core had set when it was first wetted it certainly would not have set at the second wetting and when ground fine. Professor Kennedy objects to the tensile strain, and many other speakers have said the same thing. Now I do not think that, in the matter of testing, it is of the first importance whether you use compression or whether you use a shearing strain, whether you use tensile strain or whatever you use, for it is known that they all bear a relative proportion to each other. The best thing to use is the easiest. I think that the tensile is the easiest applied and the easiest used, and therefore I think it is the best to adopt. We have not all such beautiful machines and appliances as Professor Kennedy, machines that will crush and do everything else. We have to put up with small machines that cost a few pounds, and we must be satisfied with what tests we can carry out with them. The elasticity of cement — I do not think that has been tried before, and whatever Professor Kennedy's results may be, I think we may take it that cement is practically non-elastic. Professor Kerr seems to believe that no accuracy is required in testing cement, but I am afraid his way of testing cement would be of very little use. Mr. Sharp in his letter advocates the testing of cement with sand, instead of testing the cement only. Mr. Grawitz also speaks of it; and they both of them suggest a difficulty, and that is, to find a standard material to gauge with the cement. It may be desirable for a manufacturer of very great masses to know what would be the strength of the composition when he has used it; but the ordinary user of cement, who is going to make mortar of it, if he knows simply the strength of his cement he knows the strength that his material should have after it is finished, and, therefore, to test the cement ought to be sufficient for him to judge of the ultimate strength of his structure. And as long as you keep to the cement pure and simple, you reduce your limits of error to one thing, whereas to put sand and other things with it to test it, why, you increase your range of error. Of course we can all of us only wish that we had a recognized Board to which all disputes of cement and building matters could be referred, and I am sure Professor Kennedy deserves great credit for suggesting it. I hope it will be carried out. Professor Lewis has made some very interesting experiments in respect to cement with the microscope. I have also tried to look at cement through a microscope, and I must say I have not met with the success that Professor Lewis has. I have practically come to grief with it. The only thing that I did discover with the microscope was about the non-setting power of the core. I need not say that the core has seemingly a certain amount of "set" in it, but if you look at it through the microscope you will always find that there are particles of fine cement round each granulation that of course set when the water is added, and this is the only thing I have yet discovered about cement by the microscope. With regard to the chemistry of cement to which Professor Lewis alluded, I regret that Mr. Heisch was prevented through indisposition from being present, as he would have explained the matter much better than I can. The preliminary stages of manufacture result in a mechanical combination of the raw materials which by calcination resolves itself into a chemical one, the result being a double silicate of lime and alumina; any excess, therefore, of either material in the compound is unable to thoroughly amalgamate, and hence the blowing, or otherwise faulty, cement produced. The meeting, I think, has generally misunderstood my specification. I did intend that it should be taken as a complete specification, but, at the same time, that only certain clauses, more especially those relating to weight and fineness, should be adopted as thought desirable, my argument being that until a recognized manner of testing cement is adopted no very reliable results will be obtained. So far as the manipulation of cement is concerned, the only way in making concrete or mortar is to adopt machinery for the purpose; it is the only means of securing a uniform body in the compound, and if it is even not so good as the best hand-gauged, its regularity will render it superior. I have but one word more to say: it is with reference to the tests, to which Mr. Grawitz has alluded, made by the Metropolitan Board of Works. I think I am correct in stating that the new specification, introduced by the Board in Octo-

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ber last, applies to such works only as are carried out under the Board's own supervision, and that it does not in any way affect the regulations set out in the Metropolitan Building Act.

SPRING EXHIBITIONS AND PICTURE-SALES IN NEW YORK. — I.

In view of this year's exhibitions it does not seem incorrect or premature to speak of an elder and a younger school in American art. A few years ago we began to hear of "new men" from Munich and Paris, who, however, diverse among themselves, united in differing by aim and method from all those whom the nation had been long accustomed to regard as its interpreters in art. Three years since these new men formed into a society which was organized as a protest against the methods of government of the National Academy. Its exhibitions, however, have been an equally decided protest against the methods of work of the National Academicians and their followers. And it attracted to itself, furthermore, as members or exhibitors, such men as Mr. Hunt and Mr. LaFarge, who had till then seemed abnormal in their development, and had never been associated in the public mind with the mass of their contemporaries.

When I say that the two associations now mark two contrasted schools, I do not, of course, use the word in its fullest and strongest significance. The elder school of American art has not, indeed, been a school in any sense of the word save that which may denote a large number of men working on similar lines, and producing results similar in artistic grade. Taken as a whole, it can assuredly not be thought a school to which future students will ever turn for example or for teaching, however instructive may be the work of one or two among its members. As for the newer school, it is, of course, in its infancy, a school potential, or, as some may think, of future certainty, but still in process of development. It is these two facts which just now make this younger band of workers so interesting to watch — the fact of its rapid growth, its daily, hourly expansion, and the fact that it is at actual daggers drawn with the typical men of our elder generation. He who went to this third exhibition of the Society of American Artists and forgot these things — did not know what names were absolutely new, what men were showing maiden efforts and trying 'prentice hands, who did not see the great advance others had made since their first appearance a year or two ago, who did not appreciate how they are all striking in the very teeth of our traditions, striving to win the public ear without sounding a single note such as it loves and listens for, — may indeed have got much pleasure from the pictures, but can have gained little knowledge as to the recent progress or the future prospects of our art.

The two exhibitions were open at the same time this year. The Society's was more homogeneous than ever before, and in stronger antithesis than ever to the mass of work that crowded the Academy wall.

This latter work, it must be confessed, was less good than usual. Few pictures stood out from the 760 numbers in any pleasant prominence. When a departure was made from the dead level of commonplace and tiresome reiteration, it was usually in the direction of the strikingly bad. The "new men" contributed very little, preferring to keep their work together in their own place, partly from a natural desire to make their collection as good as possible, partly, no doubt, from an idea that they thus did themselves individually also the greatest justice. There were but 165 numbers on their catalogue, but the selection had been consistent, and there were not half a dozen canvases, which, however good or bad their execution, were alien to the aims and the beliefs of the majority, and it was, therefore, all the easier to judge of the majority's merits — actual and prospective.

Let us briefly note the qualities which marked the antithesis between these walls and those of the Academy.

The terms most appropriate in the latter place are those most inappropriate here. Commonplace, mediocre, dull, are the last words we think of, while their exact opposites are constantly on our lips. These pictures are in almost every case unconventional, novel, individual, tentative, erratic — perhaps in one or two cases crude or ambiguous, and somewhat morbid in one or two more. Affected, I have heard them called not seldom, but without justice, as I think. There is, it seems to me, a note of sincerity in even the queerest products, and among the artists represented we find no copying of each other, which is one of the commonest results when affectation takes hold upon a company of men, work they on whatever line they may. With the non-existence of the commonplace, we must also note the absence here of anecdotal subjects. There were not half a dozen pictures in the room which needed a title, not half a dozen which existed for other than a reason which to the artist had been a simply artistic one. And in so working, an artist moves in the right direction, whether that reason quite justifies itself to the spectator in any given case or not. With the absence of anecdotal, literary interest, and the presence of purely pictorial efforts, we found, as we might have expected, an increasing love for and mastery of the pure technics of the art. This, indeed, is the main fact which resumed and presupposed the minor ones already noted. He who understands and values good painting, *per se*, will not care for inferior things, but will either devote himself to the simple exercise of his skill, — and when good, is not this often enough? — or will pass by its means to those higher things which can *never* — long as we have ignored the fact — exist satisfactorily together with neglect of those means. There are critics to-day who are not content to see our younger men making themselves good painters, who are not content to see our art freeing itself from the ruts of the commonplace, the bathos of sentimentality, and the ludicrous technical inefficiency, which have made it a by-word; who are not content to wait for the possible development of highest beauty, and deepest imagination from a sound undergrowth of technical knowledge and manual accomplishment. Should we not appeal to them to wait more patiently for these things, bidding them look back if they would judge the worth of what we do to-day, not only ahead to some rare ideal? Should we not say "wait till our painters master the language of art, and till our public understands and values it"? Let us not match our new men only against the heirs of technically trained generations in the Italy, the Spain, the Holland of the past, or the France and Belgium of the present, but let us remember their parentage and the traditions they were born among, and credit them with their vast advance as well as with their evident shortcomings. It is a captious and, moreover, a harmful critic who, thinking of them thus, can deal savagely with this year's best pictures.

At the Society's rooms, to cease from generalities, the two canvases that attracted us first, were Mr. Chase's portrait of General Webb, and Mr. John Sargent's of Carolus Duran. They were apt to be noted together, not only for the excellence common to them both, but for their divergence from one another. They varied in subject as much as in style; the picturesque, Semitic youth and unusual costume of the French painter, being most unlike the white hair and conventional dress of Mr. Chase's sitter. There was much discussion as to the relative merits of the two portraits, for it is a bit of very usual stupidity to think that when two things are unlike, one of them, for that reason, must be far inferior to the other. Both these portraits were admirably conceived and painted, both were, technically speaking, work to delight an artist's eye, and it was a matter of taste, not of right or wrong, whether one preferred the vigorous accents of Mr. Chase's brush, or the smoother effect which hid from the careless observer how broad and sure had been Mr. Sargent's touch. With all the charm of pose and tone in the latter's work, however, and the true life of the face, there was unquestionably a flatness that had been avoided in the portrait of General Webb. There was an unusual relief, an intense livingness in this latter which has, indeed, been commented upon as almost overdone. The picture has been called restless, wanting in repose; and, compared with single figures by such as Rembrandt and Holbein, it has been found to lack the dignified simplicity which indisputably makes their charm. It is the old story of the impossibility of pleasing all the world. Foreign critics complained at the last Paris Exposition, for example, that the only characteristically American note in our section was sounded where the work was crude. When the painting became good, it was European in sentiment as in style. There is no question now as to the skill of such as Mr. Sargent, Mr. Shirlaw, and Mr. Chase. It remains to approve of or quarrel with the way they use it. When Mr. Shirlaw exhibited last year a "Burgomaster" that might have been dated 250 years ago, he was told not to *pasticher* the Dutchmen, but to paint as an American of to-day, work characteristic of himself and the men around him. When Mr. Chase now gives us just such work, he is told that Holbein's sitters would not have looked thus, and that Rembrandt would have conceived a picture very differently. To my mind, it is just this divergence from classically approved schemes that forms the great merit of this canvas, that makes it a degree more valuable than Mr. Sargent's. The latter is French work through and through, French no less in the technique, which is twin to that of more than one Parisian we know of, than in its feeling and its meaning as a work of art. The General Webb is in its technique individual, and, I think, characteristically American in this no less than in the living man it shows us. It would have been a not very difficult studio *tour de force* to have masqueraded General Webb into the pose and sentiment of a Rembrandtesque patriarch, to have made him as quiescent and as reposeful to look at. It was a touch of true power that could bring out a high artistic result, while preserving the nervous, restless, quite typical Americanism of the model. Be it noted, moreover, that this was not done by means of any complicated composition, or any suggested action in the figure. And the brilliant effect of the canvas was not due to color, which was kept in the soberest tones, but to the manner of handling and the vivid life resulting therefrom. Of Mr. Chase's other pictures, very different among themselves in subject and in treatment, I have no space to speak, though more than a word is due to all, especially to his portrait of a child, (No. 33), where all the lovely dignity of five years old was admirably given.

More lines than I can devote are due to the rest of the collection, — to the interest of almost all the pictures, whether that interest centered in their merits, their promise, or their peculiar faults, I can but note those that called the most loudly for mention. Mr. Shirlaw sent several small figures painted with his usual skill, and a larger Marble Quarry, which, though crude in color, for as yet unfinished, was admirable in composition, and in the spirited drawing of the men and horses. Of Mr. LaFarge's three numbers, the most attractive was a small portrait of himself painted some twenty years ago. His large portrait of a boy and dog was not very pleasing, and his Still-Life, (No. 30), though it contained as a matter of course, some good painting, was too inartistic in conception and general treatment, and too ugly in color, to satisfy those who knew what he might have done. One marveled that this mechanical, tiresome canvas, could be from

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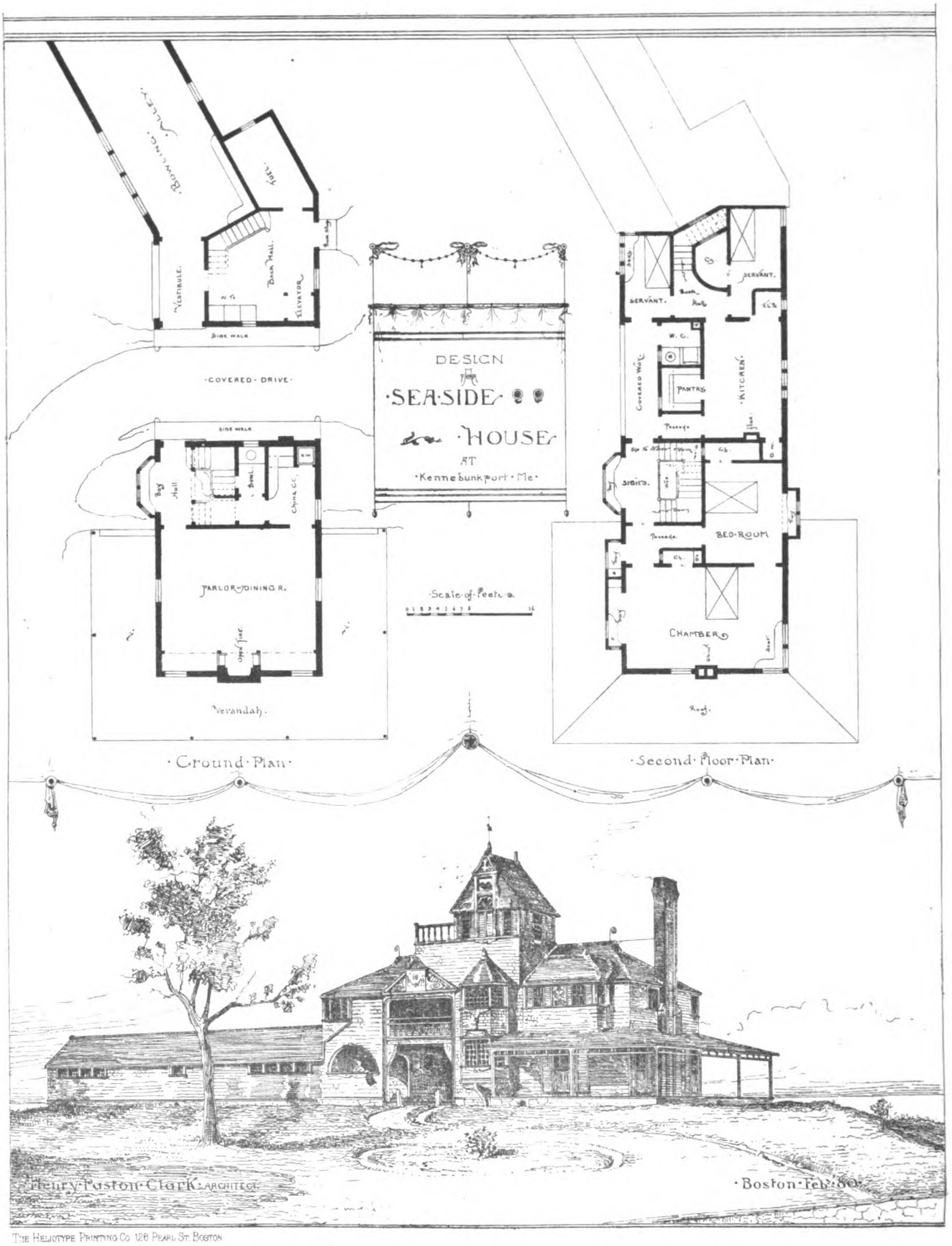

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the same brush that had painted in previous years the Bather s wet drapery and the divine Andromeda and tiny Venus. Those who had seen in these things perhaps the rarest work ever done by an American hand, could but protest against Mr. LaFarge this year, comparing him, as surely no artist can feel aggrieved to be compared, only against his better self. Mr. George Fuller's works —a lady's portrait and a large landscape—were not unusually good for him. Mr. Twachtmann's landscapes were among the strongest and best things in the room. The large one, April Clouds, was especially fine. Mr. A. H. Thayer's Autumn in a Berkshire Pasture (No. 40) was a proof that extreme delicacy of result is not incompatible with very broad handling. It was a reassuring picture, moreover, from the fact that it showed how poetical a canvas may be wrought after the same scenes that we have been accustomed to think of as resulting in the tin-tea-tray or omnibus-panel landscape dear to the typical American artist of the past. It is, thanks to such work as this and Mr. Twachtmann's, to such exquisite bits as Mr. Dewey's August Day (No. 39), to such strong work as Mr. W. S. Macy's (No. 29), to such simple, clever, satisfactory things as Mr. Walter Palmer's Grez (No. 98), and the studies of Mr. W. Ferdinand Macy of Nantucket, that we feel at last able to say that this typical American artist is or is about to be in very truth a thing of the past. There was more good landscape work than all this in the collection. We must not forget Mr. Foxcroft Cole or Mr. F. S. Church. Mr. Bunce's Venetian canvases were clever and very decorative, and I think, like the reality; but one has seen Venice painted in so many ways, from the way that travesties to the way that glorifies and idealizes, that it is hard, even with recollections of actuality to help us, to say whether any given canvas is like that actuality or not. No such doubt assailed one before Mr. Harry Chase's fine, broadly painted marine, On the Flemish Banks. A boat in the foreground was in the hollow of a wave, throwing the horizon line very high. It was by no means a small achievement to have so well managed so difficult a design, and to have so well given the surface no less than the power and sweep of the waves. That Mr. Homer Martin's large sunset picture (No. 93) was not like reality or any very charming fancy, was only too plain. It was one of the few wholly uninteresting things in the room. Mr. Wyatt Eaton in his Manasquan River, showed how the picturesque — commonly so called — is no necessary element in landscape art. This simple, level scene, with a board fence very prominent, made, so simply and broadly treated, a most satisfactory picture. A new name was that of Mr. Ross Turner, who sent from Munich two capital little landscapes full of light and air, and some still-life canvases admirably done. Mr. Tiffany's Madison Avenue (No. 9) shared the curious defect so often seen in his landscapes: we received the impression that the original had been no larger than this tiny record, that he had painted a toy village accurately and cleverly from some Nuremberg importation. His Still-Life (No. 38) had been painted more for the resultant decorative effect of the canvas than for any intrinsic interest as a composition. So viewed it was most successful, very charming in its light airy key of color, and showing some admirable bits of painting, especially in a certain little pale-green vase. Mr. Albert Ryder had for some time been the delight of connoisseurs, but this year he got himself more generally talked about by the public. That it failed to appreciate him very thoroughly is not to be wondered at when we consider that the charm of his work lay in singular, poetical impressions conveyed by means of a delicately sombre coloring. The definiteness dear to the Philistine heart and the glare which the Philistine mouth is apt to call "coloring," were far enough from his performance, which, more even than any other we have noticed, testified to the speedy emancipation of American landscape art from its former prosaic bonds. Was not such testimony, so charmingly given, enough to make one forgive some slight inaccuracies of drawing in one or two of Mr. Ryder's paintings?

If we return now to the figure subjects on the wall, we are driven once again to note their divergence from the Academic average. Even the portraits, properly so called, seemed less done to order for commercial reasons than studied from humanity for the lessons it could teach and the pleasure it could give, and the mere "studies" did not seem to have been "done out of the head," or from studio models, as those have usually appeared to be which we have been used to seeing at our annual exhibitions, but were definite renderings of individuals, portrayed, quite often, in an individual way. Mr. Eakins sent a life-sized portrait of a lady at the piano (No. 104), which was admirable in the head and hands and in the spirit of the whole, though neither the details of the composition nor the color were very agreeable. Mr. George Brush, who was scarcely more than a *débutant* this year, — I remember to have previously seen but a single small picture of his — made his mark with a life-size Miggles and Her Bear. The face was lovely, — not that of Bret Harte's Miggles, however, — the composition good, and the drawing of the figure very fine. The flesh-tints and the coloring generally were simple and straightforward, and showed none of that search for individuality of "tone," which to some eyes lowers, while to others it enhances, the value of such clever things as we had from two pupils of the late Mr. Hunt. Mrs. Whitman's Study of a Boy with a Violin was very strong and life-like, and Miss Bartol's Mother and Child was admirable in pose and spirit, recalling the master, it is true, but with a reminiscence, not an echo. Mr. Thayer's large Nymph and Tigers disappointed those who had looked for something of equal value with his lovely landscape. The conception was rather puerile, the color unpleasant, and the drawing, if quite accurate, had surely been done from an unfortunate model. Mr. Douglas Volk's large portrait of a fencing-master well deserved mention, as did Mr. Piggott's charming sketch, Contented, Mr. Dielman's study (No. 96), a Moorish head by Mr. Sartain, a full-length study by Mr. Moeller, sent from Munich, and a clever single-sitting sketch, very full of life, by Miss Wheeler.

If I have left Mr. Alden Weir to the last, it is not because he did not first challenge notice and long provoke examination. To say that the work of others gave one more pleasure, is merely the expression of a personal mood, and implies no denial of its strength and cleverness this year, or of the promise there was in the fact that his three numbers, each remarkable in itself, differed so widely one from another. His portrait (No. 54) was most excellent, vivid as life and simple as reality itself, all but the hair, which, as ever, he curiously failed to render. What was true of him last year was here again the truth, — he gave neither its detail with resemblance nor its general effect with accuracy. The portrait of a little girl and dog (No. 72) was less strong, but very individual in style and feeling, and those for whom that individuality struck a pleasing note esteemed it a sample of Mr. Weir's very best work. His Good Samaritan, with its two life-sized figures, was something more and something less than "*une bonne académie.*" There are men — I do not say among us — who might have better managed the very difficult foreshortening of the naked figure, and the equally difficult modelling of the flesh in full light. To do these things shows a power that has been arduously acquired. But to conceive a hackneyed scene in so fresh a way, in so serious, real, and unacademic a spirit as Mr. Weir, comes of endowment, and to paint certain parts of it so admirably as were painted the Samaritan's noble head and hands, and, in a less degree perhaps, the head of the wounded man, were achievements that showed such natural endowment had been assisted by a strong and clever hand.

Mr. Muhrmann's water-colors were as good as usual, except the one numbered 131, with its strangely presented cow.

The sculpture, though not great in quantity, was one of the special attractions of the exhibition. Besides Mr. O'Donovan's shadowy bas-reliefs and Mr. Olin Warner's medallions of his average excellence, we had a bust of Mr. Alden Weir, from the hand of the latter, that was startling from its almost antique vigor of conception and grace of treatment. The illusion was heightened by the classic, spirited beauty of the head, and also by the tinting of the plaster, which had assumed exactly the color of long buried-marble. Mr. St. Gaudens's half-length of President Woolsey, ordered for Yale College, was the wonder of critics, so accurate the likeness, so unconventional yet simple and artistic the conception, so beautiful the execution. The texture of the surfaces, worked with careful, delicate, almost brush-like touches, yet deprived of nothing in breadth, was well worthy of notice. It was as different from the mechanical smoothness of average modern work as from the inartistic over-elaboration in detail and accessories, that has usually characterized a desire for less insipidity. The statue was as distinctively American, it seems to me, as Mr. Chase's General Webb, and, at the same time, as artistic. The difference in spirit between the two well exemplified the difference that should be maintained between the spirit and the ideals of the two arts. Two such examples of plastic art as these shown by Mr. Warner and Mr. St. Gaudens were enough to settle the question whether or no truly good sculpture is possible in our day and country.

M. G. VAN RENSSELAER.

THE ILLUSTRATIONS.

FIFTH AVENUE RIDING SCHOOL, NEW YORK, N. Y. MR. C. PFEIFFER, ARCHITECT, NEW YORK, N. Y., AND MR. F. SCHUMANN, C. E.

THE roof rests mainly upon four iron columns, each carrying about forty-six tons. The problem was to make the side walls as thin as permissible, in order to gain as much room as possible for the ring hence the longitudinal trusses were decided upon. Another reason, a better opportunity for a good foundation, governed the adoption of this plan. The ground upon which the building stands, is swampy, and in part, it is the bed of a creek, sometime since filled in. Placing the piers where they are, gave sufficient room for the desired foundation, while on the sides, the same could not have been done without sacrifice of valuable space, as no projection of base beyond the line of the lot would have been permitted. The arched trusses are built up of two-inch planks, twelve inches wide, and thirty feet long, breaking joint every five feet, nailed together with twelve-penny nails, two nails to the square foot; the nails being driven normal to the curve of the truss; the layers are securely bolted together by ¾ inch bolts, two bolts to each bay of the truss. The ends of these trusses are received by cast-iron shoes, to which they are securely bolted, the shoes being supported by consoles bolted to columns built up of wrought-iron plates, the two outer faces being formed by two plates, each ¾ inch thick and 21 inches wide, while the webb or side plates are ⅝ inches thick and 17 inches wide, all secured together by wrought-iron angle-bars, 4 inches by 5 inches, and riveted with ¾ inch rivets; these columns rest upon cast-iron plates 1½ inches thick and 2 feet square, in turn resting on solid masonry; the column being kept in place by a projection on the upper side of these plates. Each pair of columns, longitudinally, is tied together by a 1¼ inch wrought-iron tie-rod, which is connected to the foot of each columns. The transverse studs between each pair of columns, and between

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the columns and the side walls are, as shown, fifteen-inch rolled iron beams, stiffened by angle bars riveted to the webb of the beam. The longitudinal studs between the columns and the end wall are 12 inch by 14 inch oak beams whose bearing ends are received in cast-iron shoes. The tie-bars which resist the thrust of the arched trusses are wrought-iron rods which are pinned and bolted together, and, as will be seen on the plan, form a continuous horizontal tie about the building. The general structure and arrangement of the trusses is shown clearly in the detail sheet.

DESIGN FOR A SEASIDE HOUSE, KENNEBUNKPORT, ME. MR. H. P. CLARK, ARCHITECT, BOSTON, MASS.

NEW OFFICE-BUILDING IN WALL STREET, NEW YORK, N. Y. MR. G. E. HARNEY, ARCHITECT, NEW YORK.

BUCHAN'S PLUMBING.[1]

The readers of the London *Building News*, who are a large class, even in this country, will remember many lively and sensible articles and answers to correspondents, signed W. P. Buchan, Glasgow, in which a degree of earnestness and painstaking was shown in explaining various mysteries of plumbing, which it was very pleasant to notice. The more important articles contributed to that journal were collected in a small volume some three years ago, with some additional matter, the whole forming, as the author claimed, a suitable text-book for apprentice plumbers, to which they could turn for explanation of the difficulties which they might meet in their work; such a book as its author himself had felt the need of in his own early experience.

The success of the little volume was very great; not only was it eagerly bought by architects, builders, householders and students, as well as plumbers and their apprentices, but it was adopted as a text-book in universities and technical schools; and the first large edition having been exhausted, advantage was taken of the opportunity to add to the second a large amount of fresh matter, — a desirable feature in any treatise on a science so rapidly advancing as that of plumbing.

In its present form, the work constitutes a singularly practical, sensible and useful little hand-book, not for plumbers only, but for all who own or use the apparatus with which the plumbing trade concerns itself. To these it is as interesting, and quite as useful, to gain a knowledge of the mode of fitting up and the proper action of the traps, valves and pipes, which supply their wash-bowls and baths, as it would be to understand any other branch of household science, and the rapidity with which the book has sold shows the public appreciation of this fact. For architects, and others who have to superintend plumbing operations, an additional advantage is found in the great amount which it supplies of that practical knowledge of how things ought to be done, which is generally picked up by slow degrees through a long course of actual observation and experience, and which is, so far as we know, found in no other text-book on the subject. Much more might be added, and some things changed, to adapt it to the American peculiarities of practice; but such as it is, it is already pretty widely known on this side of the water.

By the English custom, much of the metal roofing, gutter and conductor work, which with us is the exclusive province of the roofer or carpenter, comes upon the plumber. For this reason, the first part of Mr. Buchan's book is taken up with instructions on that subject, which alone would form a valuable treatise to architects and builders. Many a young architect, especially, who imagines that the leakiness or tightness of a roof is a matter which Fortune alone decides, will by grateful for the clear and well illustrated directions for the proper arrangement of flashings, valleys and gutters, the metalling of skylights, and fastening of conductors, which will throw a flood of light on questions which even roofers do not always understand too well.

The second part is devoted to the sanitary works which we understand under the name of "plumbing," and, allowing for the material differences in modes of work between the English plumbers and our own, nothing could be clearer, fuller, or more practical.

The author shows, moreover, an independence and sincerity in speaking, as he must, of various patented appliances, which add greatly to the value of the book as a guide to the inexperienced amateur. Naturally, his own inventions, of which he mentions several, seem to him peculiarly successful in accomplishing their object; but it is only fair to say that, with some of them at least, their public reputation justifies his confidence.

Here and there are some observations which may have a general interest. Speaking of some experiments upon the rapidity with which water under a given head will pass through nozzles of the same diameter, but of various shapes, he illustrates a peculiar discharge-tube in the shape of a double conoid, through which, if smoothly polished inside, it is found that four times as much water would flow in a given time as through a plain nozzle of the same calibre, and under the same head; and states as an interesting fact that in the city of New York such conoidal nozzles, in the form of couplings, and beautifully polished inside, are used to connect the house-pipes with the street-service, by which means the wily proprietor obtains three or four times as much water through the regulation size of coupling as his neighbor who uses the plain fitting.

[1] Plumbing; with Supplementary Chapters on House-Drainage, by William Paton Buchan. Second Edition. London: Crosby, Lockwood & Co., 1880. Received by Little, Brown & Co., Boston.

An observation in regard to the action of lime or mortar upon rain water is new to us. It has often been remarked that lumps of mortar in lead cisterns cause corrosion, and rain-water which has flowed over lime will act upon lead pipes. Our author explains this, quoting from Dr. William Wallace of Glasgow, on the theory that ordinary rain-water, holding in solution some carbonic acid, coats the lead with which it comes in contact with a film of carbonate, which preserves it from corrosion, much in the same way that spring-water forms a crust of carbonate or sulphate of lead; but if the water containing carbonic acid passes over hydrated lime, the latter abstracts all the acid, allowing the dissolved oxygen and perhaps nitric acid which may be present in the rain to act freely upon the metal.

MR. HYATT'S LATER EXPERIMENTS ON CONCRETE FLOORS.

In the fall of 1877, I published and distributed a little work (see *American Architect* for January 12, 1878) setting forth the results of my experiments with iron and concrete for floor constructions. Since that time I have made over a hundred additional experiments, resulting in the discovery that common stock-bricks, combined with tie metals in "gridiron" form, make a perfect fire-proof floor, giving a maximum of strength with a minimum of materials and labor, and therefore cheaper than any other floors hitherto made of a really fire-proof character.

A narration of my experiments would require a volume larger than my former one, and the limits of a newspaper allow only a statement of conclusions. I can, therefore, merely state in brief the following facts: The sample floor-sections tested were made by placing bricks on edge or end between the blades of metal upon a flat platform or centering of wood, the cement being applied in the form of grouting. The first samples were made at my works in New York during the fall of 1878, and the results were so surprising that I resolved to repeat them at the earliest opportunity. My experiments in New York were interrupted by severe illness, and it was some months after my arrival in England, in July last, before I was able to resume them. Accordingly, in the fall of last year, I had made at the yard of Messrs. Edwards and Symes, engineers, Cubitt Town, the following sections. A brick floor 8 feet long by 1 foot 5 inches wide, and 4½ inches thick, was constructed of six rows of bricks placed edgewise and laid end to end, five blades of thin iron ⅛ in. by ¼ in. being placed between the rows of bricks, one blade between each row, the wires crossing the metals at 9 inches apart between the bricks. This floor, at four days old, upon a clear span of 7 feet 6 inches, supported 806 pounds at the centre, equal to 1,612 pounds distributed load, or say, 153 pounds to the foot super, in addition to its own weight, with a deflection of ⅛ inch. A concrete section of same dimensions made at same time for contrast with the brick, composed of same amount of Portland cement with same number of metal blades, sharp sand being substituted for the brick, was incapable of supporting any load at four days old, and at the end of 7½ days could sustain on a deflection of ⅛ inch but 196 pounds at centre, equalling 392 pounds distributed load, or 37 pounds per foot super. The brick section, when seven days old, sustained, on a deflection of ⅛ inch, 225 pounds per foot super, in contrast with the 37 pounds of the concrete floor. At the end of 12½ days, the brick floor sustained on a deflection of 3/16 of an inch, 469 pounds per foot super, as against 177 pounds sustained on the same deflection by the concrete floor. Brick floor sections of 9 inches and 13½ inches deep were also made and tested with equally remarkable results. Tested by fire, the most surprising thing discovered was the ability of common stock-bricks to resist heat and flame equally with the best fire-bricks. These floors are, therefore, easy of construction; the materials to be found everywhere, cheap and abundant, and are put together like concrete constructions, without skilled labor, the bricks being merely well soaked in water, placed in position between the metals, and then bonded by a cement grouting made of pure cement poured in between the joints of the bricks and stamped home.

Thaddeus Hyatt.

MEMORIAL TO THE COUNCIL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

We give below the memorial, which is supported by such men as Colcutt, Edis, Pearson, Scott, Seddon, Spiers, Waterhouse and more than a hundred others, in favor of the profession as a body, independent of all society lines, taking a united stand against the demoralizing manner of conducting competition into which the public has fallen: —

We, the undersigned, Fellows and Associates of the Royal Institute of British Architects, being fully convinced of the unsatisfactory state of public architectural competition as at present conducted, beg respectfully to bring the subject before the Council of the Institute for their consideration.

Your memorialists are of opinion that this question can most successfully be dealt with in the interest of the whole profession by the Institute, as representing so large a section of it, and they earnestly hope the Council will be able to devise a remedy, which while ensuring greater advantages to the public, will at the same time place the competition system on a more satisfactory basis.

Your memorialists are of opinion that the necessities of the case call for united action on the part of the profession, and that the most effectual way of ensuring this will be to devise some scheme whereby

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all members of the profession can agree not to take part in any public competition unless a professional adjudicator of established reputation is appointed, and to such a condition, if generally accepted, your memorialists are prepared to bind themselves.

And we the undersigned, architects, not being members of the above society, are desirous to aid this reform in public competition set forth in the memorial, and we are willing to bind ourselves under a similar condition, if generally adopted.

Here are to follow the names of subscribing members of the R. I. B. A.

BUTLER MINE FIRE.

MUCH has been published relative to this fire, and some very erroneous ideas entertained in regard to it.

The fire is in the fourteen feet, or Pittston vein, which at this point lies very near the surface, and on the highest ground of the Butler Coal Co. It originated in the month of May, 1877. An unfortunate woman took refuge for a few nights in an old slope that led to the old workings of the Butler Coal Co., of Philadelphia, situated about one mile back of the town of Pittston. During her stay, in order to keep herself warm, she built a fire, and when she departed it is supposed she made no effort to extinguish the glowing embers that were reaching out, and spreading fire among the coal chips and combustible material that surrounded the entrance. Not many weeks after, people who had occasion to pass in the vicinity of the old slope, noticed that a fire were raging in the abandoned chambers beneath; which led to an investigation, in which it was discovered that no less than three to four acres were in flames below, and that the fire was spreading very rapidly through the old workings, feeding upon the massive pillars of coal left for the support of the roof, together with great quantities of refused coal "gob" left at the bottom, in the ordinary process of mining.

Efforts were at once made by the Butler Coal Co., to stop the fire, and an offer was accepted from a certain miner to cut it off. He was to receive five hundred dollars, together with what coal he could remove from the threatened chambers, and within bounds of his cut-off. But instead of locating his cut-off square with the out-crop, he actually commenced operations parallel with it, and had been at work some four months before it was discovered by the company. In the meantime the fire had made rapid progress.

At this juncture, C. F. Conrad, C. E., was engaged to make a survey and report. Mr. Conrad's survey showed that the fire was restricted from spreading in certain directions: on the north and east by the out-crop of the vein; on the northwest the fire was shut in by a "fault," or dislocation of the strata, on the southwest the fire had open way to sweep its path through the workings of the Pennsylvania Coal Company, and thence under the town of Pittston. It was on this side that the progress of the fire must be stopped.

The plan adopted was to make a cut from the surface down through the laminated slaty rock, and coal, to the bottom rock, sufficiently far south to allow of its completion before the fire could reach it. The cut-off is twelve hundred feet long, and from thirty-five to forty feet wide, including a tunnel 240 feet long, which was made through one of the chambers. Before locating the cut-off, it was ascertained that a fire had occurred in the same vein in 1856–7, and its location made to pass directly through the centre of this old fire, thereby saving many hundred yards of excavation. In the process of excavation, a number of distinct impressions of mollusks of the silurian age was found.

The cost of the work has been about $24,000, about 45,000 cubic yards of material was excavated, and about 4,000 cubic yards of dry wall laid, without any serious accident. It is expected that this plan will succeed, and when the fire reaches the cut-off, it will be forced back, as there will be nothing for it to feed upon. — *J. W. Berry, C. E., in Engineering News.*

A QUESTION OF COMMISSION.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — I have been employed the past year in designing and superintending the building of a church, at the customary five per cent commission. Mr. K. was also engaged as superintendent under me. In making the final settlement is it customary for the pay of the superintendent to be added to the cost of the church before determining the architect's fee, or is he entitled to five per cent on the total cost of the church, less the amount due the superintendent?

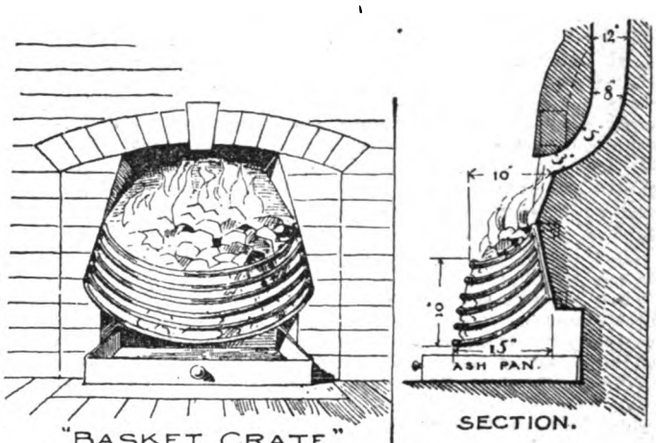
This is the first case of the kind arising in my experience, and not knowing the customary practice of the profession in the premises, I would be greatly obliged if you would enlighten my ignorance.

C. C.

[WE have never heard of a case such as our correspondent mentions. Our belief is that the superintendent's salary could not be justly added to the cost of the building before calculating the architect's commission. If the owner is willing to pay for a competent superintendent under the architect's orders, we should think it a little crowding to collect a commission on the superintendent's pay. The wording of the schedule runs, "the total cost of the works executed from his designs," and it would be seemingly as proper to include the superintendent's salary in that total cost as the premium on the insurance, the interest on the first payments, or even the architect's own commission, and no more so. We know of cases where the architect, for his own satisfaction, employs a superintendent, and of course pays his salary out of his own commission, this usually when the superintendent's time is divided between several buildings. In other cases the salary has been paid by owner and architect conjointly. — EDS. AMERICAN ARCHITECT.]

THE BASKET-GRATE OF THE ALLEGHANY REGION.

IT has been thought that the "Baltimore low fireplace grate" fulfils the best conditions for allowing a fire to perform its duties to the uttermost. The domestic fires in the "basket-grates" of the mining-regions of the Alleghanies, where the soft coals prevail, are fires that will compare, for beauty, comfort and good cheer, with any fires ever seen in any part of the world. The "basket-grates" are so set in the chimney-back, as to lean outwards for about one-half their size. They project so much in front of the flue, and lean so well forward, as to make, when the coals are all aglow, a powerful reflecting surface. The following diagrams serve to illustrate the form and position of the "basket-grate" from which probably the invention of the low fireplace grates of the East have been derived. The diagrams show how the grate projects outward from the bottom, and hangs downward from the top like a tilted basket, wider at the bottom than the top. It should be noticed that



"BASKET CRATE"
As used in the Alleghany Coal Fields.

the face of the back wall in the grate has two different slopes: one, the lower half of the back wall, slopes from its centre backwards and downwards; the other, the upper half, slopes from its centre backwards and upwards. The effects of this arrangement are plainly seen in the operation of the fire. The lower half of the grate is thus made to contain the bulk of the fire, while the upper half performs the duty of a reflector in throwing off the heat of the burning coals into the room. In very many fireplaces, and in ill-set grates, there are losses of heat that amount actually to 50 or 60 per cent of the amount that is generated.

W. G. ATKINSON.

PUBLICATIONS RECEIVED.

SPECIAL REPORT OF NEW YORK STATE SURVEY ON THE PRESERVATION OF THE SCENERY OF NIAGARA FALLS, and Fourth Annual Report on the Triangulation of the State. For the year 1879. James T. Gardner, Director. Albany: Charles Van Benthuysen & Sons. 1880.

BEVIS'S BUILDERS' PRICE BOOK for Architects, Engineers, Surveyors, Builders, and Contractors, and Guide for Estimates. By Henry C. Bevis, Surveyor, etc. Third Edition. London: Bevis & Co. 1880.

NOTES AND CLIPPINGS.

VALUE OF THE FRENCH NATIONAL PALACES. — The Bureau of Civil Buildings and National Palaces has just issued a statement concerning the approximate value of the public palaces: in it the Palais Royal, where the Council of State is at present, is valued at 10,000,000 francs; the Luxembourg Palace at 60,000,000 francs; the Elysée at 10,000,000 francs; the palace at Versailles, with its parks and adjoined buildings, at 112,000,000 francs; the Trianon at 13,478,000 francs; the palace at St. Cloud at 4,977,000 francs; the palace at Rambouillet at 3,044,000 francs; the palace at Compiègne at 13,000,000 francs; and the palace at Fontainebleau at 55,000,000 francs. The values of the Louvre and the Tuileries are not stated.

EFFECT OF COLD ON IRON AND STEEL. — Mr. J. J. Webster, an English engineer, has made a series of experiments to determine what effect extreme cold produces on iron and steel. After submitting numerous specimens to temperatures varying between + 10° C. (+18° Fah.) and — 21° C. (— 38° Fah.), he reached the following conclusions: First, the tensile power was not affected by the low temperature, but the ductility of iron bars was increased one per cent, and that of steel bars three per cent; second, the power of resisting transverse strains was diminished three per cent, and the flexibility sixteen per cent; third, the power of resisting shocks was affected in the following way: —

Metal.	Decrease in resistance under shocks.	Decrease in flexibility.
Wrought iron	3 %	18%
Cast tool-steel	3½%	17%
Malleable cast-iron	4 %	16%
Cast-iron	21 %	not determined.

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Driven Wells. — Prof. George H. Cook, State Geologist of New Jersey, in a lecture lately delivered before the Newark Board of Trade, gave some information of general interest on the recent attempt of the authorities of that city to draw additional supplies of water from driven wells at Belleville, near the Passaic River. We quote as follows from the *Metal Worker:* "The water in the river was thought to be good when the present system of water-works was established some years ago. In the desire to improve the navigation of the river, the reefs had been taken out, and this had allowed a freer flow of tide-water, and the salt-water passed further up the stream than it did before. Added to this, a portion of the sewage of Newark is carried up the river by the tide. The country from Paterson to Belleville has grown in population and been built up, and factories have been established all along the river. In consequence of all this the water is not as good as it used to be, but still it is not very impure. The best way of getting a larger and better supply is the question to be considered. Experiments have been tried with driven wells in a strip of land at Belleville, draining about two miles of alluvial soil and about half a mile wide. Pipes have been driven down to a depth of 40, 42, and 48 feet without striking rock, and it is reasonable to suppose the soil is filled with gravel to that depth. The water obtained from these wells seems to be pure, cold and bright, but a little hard. This would seem to be no objection except for manufacturing purposes. These driven wells have been operated several months, and from them 2,500,000 gallons of water daily have been pumped. When the pumping began, the water sank until the sinking reached five feet, and when the pumps stopped it rose. It was noticed that the water rose and fell as the tide rose and fell, though not at the same time, and not as much as the tide, but one could not help concluding that the water came from the river and had filtered in through the earth. The basin in which these wells are situated covers a square mile and a half, and holds 209,000,000 gallons of water. If 3,000,000 gallons were pumped from it per day, it would take 600 days to pump this basin dry, and there is enough water there to supply the city for two years before it can be pumped out. As this water is pumped out it will be replaced by river water filtering in, and it will become softer. Last year, in Trenton, at the State Prison, a well 12 feet in diameter was sunk in sand and gravel for a depth of 50 feet down into solid rock, and it was found that the water at a certain level would supply 135,000 gallons per day, but at another level would not supply more than 68,000 gallons, and at another not more than 20,000 gallons. Professor Cook thought if in the basin in which the driven wells are situated these wells could be deepened, the supply would be increased indefinitely for a time, and perhaps could supply the whole city temporarily. He was confident a great increase could be obtained on account of the location of these wells near the river. He thought the impurity that filtered into the soil from the river would gradually help to clog it up, but the water would be better than we now get."

Hampton Court Palace Clock. — The antique and curious dial of the clock over the gate-tower in the second quadrangle at Hampton Court Palace has lately been replaced, and, with new works, again shows not only the hours of the day and night, but also, among other things, the day of the month, the motion of the sun and moon, the age of the moon, the phases and quarters of the moon, and the moon's southing. The dial is composed of three separate copper disks of different sizes, with a common centre, but revolving at varying rates. The smallest of these is three feet three and one-half inches in diameter, and in the middle of this is a slightly projected globe, painted to represent the earth. The quarters, marked on the central disk by thick lines, are numbered with large figures, and round the edge the disk is divided into twenty-four parts, a red arrow painted on the second disk pointing to these figures, and showing at once the quarter in which the moon is, and the time of southing. Next to the figure of the earth in this central disk, a circular hole ten inches in diameter allows a smaller disk travelling behind to show the phases of the moon. On the second disk, four feet one and one-quarter inches in diameter, but of which only the outer rim is seen, are twenty-nine divisions, and a triangular pointer, projecting from behind the central disk, shows the moon's age in days. The largest of the three disks is seven feet ten inches in diameter. The new clock drives both the astronomical dial and the hands of the ordinary clock-face on the opposite or western side of the tower. In the mechanism, many ingenious contrivances have been employed, and while the clock is guaranteed not to vary more than five seconds a week, it is not expected to vary even so much as that. — *London Times.*

A Legal Decision. — A case of great importance to architects, and involving in a great measure the beauty of town buildings, has been decided in the Queen's Bench Division of the High Court of Justice, March 24. It appeared that under a local Act of Parliament in Liverpool the authorities prohibited projections of a building in front of an arbitrary line "over or upon the pavement." The town surveyor, like nearly all his brethren in office, insisted that the erection of an oriel window, fourteen feet above the foot-path, and projecting two feet and a half beyond the front of an hotel, was contrary to the Act. He applied to the stipendiary magistrate, who refused to convict. An appeal was then made to the High Court, which confirmed the magistrate's decision, and declared that "the object of this and kindred enactments was the protection of foot-passengers, and the projection at such a height could not affect them."

The Lorillard Expedition. — M. Désiré Charnay states that he has sent everything before him from France to Vera Cruz. There are over four tons of implements and machines. Two tons of elastic hemp paper for moulding purposes, dredges for the sacred lakes of Yucatan, with which to search for the jewels cast into the water in idolatrous worship as offerings to the gods, ladders in sections with iron clamps, and photographic material are among the freight awaiting his arrival. No agreement with the Mexican government has yet been made, but M. Charnay will offer to share with that country the benefit of his discoveries. The Mexican minister hopes that he will meet with a cordial reception. M. Charnay does not expect to return for two years.

American Valuations of Bric-a-Brac. — In a letter to the New York *Times*, Mr. James Jackson Jarves says, in speaking of the late Demidoff sale at San Donato: My countrymen as yet scarcely appreciate the valuations placed by European connoisseurs on choice articles of bric-à-brac. Many left commissions to secure some of the chief and most beautiful things, showing their artistic appreciation, but failed lamentably in their financial estimates. Could they have been present at the last three days' sale of the snuff-boxes, the enamels, — Italian and French, — jewelry of the fifteenth, sixteenth and seventeenth centuries, old silver plate, — especially the English, — they would have been taught a practical lesson in this respect that would have astonished them. They would have seen dealers from Paris, London, Berlin, Dresden, Vienna, and even little Switzerland, — not to speak of the princely collectors, — sharply contesting small objects, such as snuff-boxes, rings, flagons, dishes, etc., that were selling at from $1,000 to $8,000 each. A little *aiguière* that had been valued by Tiffany & Co., as an extreme figure at 900 francs, sold for 5,700, and a small English silver tea-pot, as dear at 300, went in a few seconds to 1,200. A many-millionnaired gentleman, who coveted a repoussé silver plate at 1,000 francs, saw it in a minute knocked down for 8,000. French work of the time of Louis XIV. and the Regency, of almost any character, commanded extravagant prices, while other articles, much finer artistically, of German or Russian origin, and more interesting in composition, were almost given away in comparison. As a speculation, if one, the net result to the Prince must be a heavy loss, for the expenses of such a sale are simply enormous. Besides $20,000 spent in catalogues and given away, a small army of assistants, guards, etc., has to be kept for many months, while by orders there are telegraphic reports sent daily to all the chief papers of Europe and to the *Herald* of New York. Those of our readers who have catalogues of the San Donato sale, by turning to No. 1,238, will read an account of a remarkable silver toy made by Jamnitzee. This sold at 57,000 francs, and No. 1,189, a large silver *terrine*, for 40,000 francs. Fashionable ladies spent their mornings at the sale for entertainment, as at an exciting reception. To all the prices cited here must be added five per cent auction commission, paid by buyers, as is the custom in France and Italy.

The San Donato Treasures. — Many people will probably read with surprise of a great sale of the treasures from the Demidoff villa, San Donato, France, since they remember the series of auctions which took place in Paris three months prior to the Franco-German war, in 1870, when it was generally supposed that the contents of the famous Florentine villa were dispersed. The fact was, however, that so enormous had been the accumulation of *objets d'art* that a vast quantity of articles was piled away like lumber, and no sooner had the halls and galleries of San Donato been stripped, and their contents sent for sale to Paris, than they were re-filled from the stores which had long been concealed. These (for the most part inferior to what was sold in 1870) are what are now passing under the hammer. The owner of the collection sold in 1870 was Prince Anatole Demidoff. Like his brother collector, the Marquis of Hartford, he died in Paris, within a few weeks after his sale was completed, in April, 1870, at the age of fifty-seven. He had of late years resided almost continuously in Paris, where his bent form and haggard aspect were almost as well known as the Café Anglais. The Parisians gave him the dreadful nickname of Prince Decomposition. The great fortunes of the family were chiefly due to the energy of Prince Anatole's father, in working his malachite and other mines in Siberia, and the money derived from this source he (the father) invested in works of art, of which he was passionately fond. Most of his time was spent in Italy, and his vast means enabled him, in an impecunious country, to become the possessor of almost anything he desired. He is said to have given the Pope $200,000 for his title of Prince of San Donato. The late Prince Anatole married, in 1841, the Princess Mathilde, cousin of the ex-Emperor Louis Napoleon. — *New York Times.*

Japanese Marble. — Signor Gagliardi, an Italian Professor at the Polytechnic Institute in Tokio, who was lately commissioned by the Japanese Government to explore the Ibaraki mountain range, reports that he has found several veins of marble of different colors. One mountain, Suvoyama, seemed to him to be a mass of white statuary marble; and he also declares that he came upon some black marble equal to the finest in Europe. He anticipates that if care be taken in quarrying, and facilities of transport be provided, Japan will become the great marble market for the world.

The Black Walnut. — Hon. E. C. Whiting of Monona County, one of the veteran tree-planters of Iowa, says, in the Horticultural Report for 1877: "If I were to plant a section of timber for investment for an my children, I would have it all black walnut. A tree will grow to a sawing size sooner than pine, and even now in our markets it is quoted at three times the price of pine." The *Iowa Forestry Annual* for 1879, a little pamphlet issued under the auspices of the Horticultural Society, and containing much valuable information on tree culture, says: "Careful observations during the past two years in the prairie States convince us that the black walnut makes most rapid growth on our prairies rich in humus, and yet having a porous subsoil, so that it will not suffer in extremes of wet or drought." H. C. Raymond of Council Bluffs, another extensive tree-grower, says, in *Forestry Annual* for 1879, that black walnut, planted by him ten years ago, average five inches in diameter one foot from the ground, and are twenty feet high. The writer planted some nuts about ten years ago, which were transplanted at two years old, and in 1878 began to bear fruit. They are now fifteen to twenty feet high, with spreading tops.

M. Viollet-le-Duc and the Church of Vezelay. — M. Adolphe Cuillon, a landscape-painter, who passes his summers at Vezelay, states that in spite of the enormous sums that Viollet-le-Duc expended on the restoration of the church of Vezelay, the new portions are already in such a bad condition, that, for the preservation of these parts alone, an outlay is required which the older portions do not need.

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BUILDING INTELLIGENCE.

[Reported for The American Architect and Building News].

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

225,776. VALVE FOR SEWER-TRAPS. — William Wilson, Oakland, Cal. This invention is an improvement on the valve for which Letters Patent No. 220,559 were issued on the 14th day of October, 1879. In the former patent the collapsible section passed through a water-chamber, and the surrounding pressure served to collapse and close it until a superior internal pressure forced it open. This surrounding water-chamber can be dispensed with, and at the same time, the action of the valve is improved, so that water, steam or gas can only pass through it in one direction. *A*, is a collapsible flat tube which remains collapsed until a pressure inside opens it. *B*, is a short metal tube to which a short collapsible tube, *C*, is secured, while the lower end of a collapsible tube, *A*, is secured to its upper end. *E*, is a short conical tube, the lower end of which is secured to the waste-pipe below the sink so that the tube forms an enlarged portion of the waste-pipe. The tube, *B*, is placed in the upper or large end of the conical section, *E*, so that the short collapsible tube, *C*, will hang down inside of the conical section. The tube, *B*, is held in place by cement; this leaves a portion of the tube, *B*, projecting down into the conical section and a portion extending above it. The upper end of the tube, *A*, which is secured to the upper end of *B*, is connected with the waste-pipe of the sink above; any water passing down the waste-pipe will enter the upper collapsible tube, *A*, and expand it, and pass through into the short tube, *B*, and as long as water passes through this upper collapsible tube it will also pass down through the lower collapsible tube, *C*; but as soon as all the water has passed through the upper tube this tube will collapse by the outside atmosmospheric pressure, and thus maintain the tube, *B*, full of water all the time by the vacuum in the upper end of the tube. The lower collapsible tube hangs in a chamber, and is surrounded with air, so that as soon as water ceases passing through it, it will also collapse. Any back pressure, therefore, will find this lower tube tightly closed, so that it will be impossible for it to get back through the tubes. The lower collapsible tube prevents the return of gas, while the upper collapsible tube serves to retain a body of water in the pipe, which gives additional security; but the lower tube is all that is actually necessary.

225,590. DRAG-SAW. — John Augspurger, Trenton, Ohio.

226,602. SOLDERING-IRON. — Chas. M. Dravo, Allegheny, Penn.

226,603. AIR-FEEDER TO FURNACE. — Henry T. Drain, James McClung, and Emlen G. Penrose, Tama City, Iowa.

226,607. PENCIL AND CRAYON HOLDER. — Bradley A. Fiske, Naperville, Ill.

226,612. METAL-STAMPING, PUNCHING, AND SHEARING MACHINE. — Moritz Herzberg, New York, N. Y.

226,617. CABINET-MAKERS' CLAMP. — Johan L. König, Baltimore, Md.

226,620. SEWER CATCH-BASIN. — Patrick Markey, Milwaukee, Wis.

226,625. SKYLIGHT HATCH. — Semon J. Pardessus, Brooklyn, N. Y.

226,643. TAP-WRENCH. — Thomas R. Way, Springfield, Ohio.

226,664. PILE. — Lancelot Kirkup, Brooklyn, N. Y.

226,673. ELEVATOR. — Charles R. Otis, and Norton P. Otis, Yonkers, N. Y.

226,682. SLIDING-DOOR LOCK HANDLE. — William E. Sparks, New Britain, Conn.

226,684. LOCK-HINGE. — Walter S. Stockman, Boston, Mass.

226,709. COMBINED VISE AND DRILL. — Charles Brimmer, Peru, Ill.

226,718. DRAG-SAW. — John A. Cluxton, Bentonville, Ohio.

226,745. STEAM-HEATING APPARATUS. — Joseph L. Harley, Baltimore, Md.

226,747. PLUMBER-BLOCK. — Benjamin Hewlet, Birmingham, England.

226,753. SOLDERING-IRON HEATER. — John S. Hull, Baltimore, Md.

226,756. PLIERS. — Rolla K. Jones, Watertown, N. Y.

226,758. COMPOSITION FOR WHITEWASH. — Archibald H. Kerr, Midway Texas.

226,744. ENDLESS-CHAIN SAW. — Edward Norman, San Francisco, Cal.

226,786. DOOR-CHECK. — Henry B. Pruden, Dayton, Ohio.

226,791. SAWING MACHINE. — James B. Richard, Union City, Mich.

226,795. SLATE-DRESSING MACHINE. — Francis Shenton, Slatington, Penn.

226,798. FIRE-ESCAPE LADDER. — Michel Sichel, Cape Girardeau, Mo.

9,162. (*Reissue.*) FILE-MACHINE. — Joseph C. McKenzie, Adrian, Mich.

SUMMARY OF THE WEEK.

Albany, N. Y.

CHURCHES.—Messrs. Nichols & Brown are the architects of the new Catholic Church. It is to be 50' x 125'.

A new Baptist Church is talked of.

CITY HALL.—A new City Hall is under consideration by the city and county in unison.

DEPOT.—A new Depot for Rensselaer & Saratoga and Susquehanna Railroad is to be built corner Maiden Lane and Dean Streets.

HOUSE.—I. K. Emmet, the actor, has commenced a house on the Boulevard.

REAL ESTATE.—The tendency of improvements in buildings, residences especially and real estate generally, is in the vicinity of the new Park at the West end of the city.

THE STATE HOUSE.—The appropriation of $1,500,000 for work on the Capitol, has been signed by the Governor. The south-east portion of the building is to be completed for the Senate. Much of the inside lining or finish in this portion, instead of being sand-stone,—which in the corridors has already cracked considerably,—is to be of variegated marble. The cracks referred to do not impair the strength of the walls proper, however. The contracts for the following materials were let April 20: sand, 3,000 yds. @ $1.; Howes Case Lime & Cement Co., 5,000 bbls. @ 0.75; brick, 1,000,000, @ $8.; 1,000,000, @ $7.50; 2,000,000 @ $7.; — 4,000,000 in all. A resolution was adopted by the New Capitol Commission authorizing proposals for glass, iron window-frames and sash, for south central section and south-east pavilion.

Baltimore.

BUILDING PERMITS. — Twenty-eight building permits have been issued since the last report, of which the following only, are of sufficient importance to be mentioned: —

Hannis Distilling Co., one-st'y brick warehouse, 30' x 58', cor. Ostend and Russell Sts.

Sam'l Black, 3 three-st'y brick dwells., Maryland Ave., north of Townsend St., each 17' x 45'.

Francis White, five-st'y iron-front warehouse, Sharp St., between German and Lombard Sts.

John Farber, three-st'y brick dwell., on Forrest St., near Chestnut.

HOSPITAL.—Work was resumed on the Johns Hopkins Hospital on the 19th ult., after having been suspended during the winter months, and it is thought that the immense building will be under roof by the fall.

PRINTING ESTABLISHMENT.—Messrs. A. Hoen & Co., Lithographers and engravers, are about to erect a large six-st'y brick and stone building, 30' x 187'6', on the cor. of North and Lexington Sts; first-st'y on North and Holliday Sts. to be of iron; the North St. front will be surmounted by a figure representing the art of engraving. Mr. Wm. F. Weber is the architect.

SEWERS.—The Legislature having authorized the city to issue $250,000 of 4% bonds for the construction of Harford Run Sewer, the City Council has passed the necessary ordinance for the issue of the bonds; the City Council has also appropriated $7,000 for Boundary Ave. sewer

SOCIETY BUILDING.—Ground was broken on Wednesday 22d ult., for the new Centenary Biblical Institute, which will be built on the corner of Fulton and Edmondson Aves. It will be of Gwynn's Falls stone, two stories high, with mansard roof and basement. The building will measure 79' x 67'; cost, $21,000; Mr. F. A. Davis is the architect.

RAILROAD PIERS.—The ordinance permitting the B. & O. R. R. Co. to construct two additional piers at Locust Point was signed by the mayor this week.

WAREHOUSE.—Bolton Bros. are putting up a large three-st'y warehouse, at 82 and 84 W. Pratt St., 30' x 85', the front of pressed brick.

Boston.

BUILDING PERMITS. — Brick, *Essex, No.* 180, for estate of T. T. Thompson, 1 store, 67' x 94', five stories; Rumey & Maxwell, builders.

State St., No. 7, office building, 20' x 52', for Geo. O. Shattuck; iron front, in Queen Ann style; Jas. Fagan, builder; Ware & Van Brunt, architects.

Cor. Commercial and Chester Sts., for P. Monahan, 1 Tremont House, 26' x 40', four stories; C. S. Stone & Co., builders.

Wood, cor. Glen Road, for G. W. Coffin; 1 stable, 25' x 35'; C. G. Lynch, builder.

Murray Ave., Wd. 21; 2 dwels., 28' x 40'; Wm. Donaldson, owner and builder.

Brighton Ave., Wd. 25, for W. J. Tirrell, 1 dwell., 24' x 35'; H. M. Perry, builder.

ASYLUM.—Contracts for finishing the Asylum for Aged Poor, have been awarded, and work begun; C. J. Bateman, architect.

HOUSES.—Four houses are to be built this season on Newberry St., near Fairfield. Also cor. Newberry and Fairfield Sts. will be one for Mr. E. W. Cushing; Mr. Geo. A. Avery, architect.

Brooklyn.

BUILDING PERMITS. — *Yates Ave.*, cor. Ellery Street, 2 three-st'y brick tenements, 50' x 50', owner, Edward C. Reinhardt, 756 Flushing Ave.; architect, Th. Englehardt; builder, Wm. Dafeldecker and M. Metzer.

Furman St., 1 four-st'y brick factory, 91'9" x 79' x 77'8" x 67'; cost, $15,000; owners, F. R. & W. C. Fowler, 100 Columbia Heights; architect, Isaac Gosling; mason, P. Castner.

Monroe St., 2 two-st'y brown-stone dwells., 12' x 18' x 41' x 45'; cost, 4.50; owner, F. Sloate, 349 Tompkins Ave.

Amity St., No. 141, 1 four-st'y brown-stone tenement, 25' x 75'; owner, George W. Brown, 728 Fulton St.; architect, C. B. Sheldon; builders, Levi Brown & C. E. Cozzens.

Dean St., cor. New York Ave., 1 two-st'y brick school-house, 50'8" x 104; owner, Board of Education, Red Hook Lane; architect, J. W. Naughton; builders, Ashfield & Son, and P. F. O'Brien.

South Fifth St., cor. Tenth St., 3 two-st'y brick dwells., 17'2" x 39'; cost, each, $3,500; owner, M. J. Ferguson, 82 Tenth St.; builder, R. Ferguson.

Pacific St., 1 three-st'y brown-stone dwell., 20' x 65'; cost, $10,000; owner, W. R. Adams; architect, John Mumford; builders, James Ashfield & Son and Perkins & Green.

Spencer St., cor. Willoughby Ave., 1 three-st'y frame store and tenement, 20' x 40'; cost, $3,000; owner, &c., George Loeffler, 140 Floyd St.

Spencer St., 1 two-st'y frame dwell., 17' x 38'; cost, $2,000; owner, George Loeffler, 140 Floyd St.

Hancock St., 6 three-st'y brown-stone dwells., 20' x 43'; cost, $7,000 each; owner, S. E. C. Russel, 558 Grand Ave.

Tompkins Ave., 1 three-st'y frame store and dwell., 20' x 50'; cost, $3,400; owner, Ch. Hoffman, No. 24 Tompkins Ave.; builder, J. Finck; carpenter, Ch. Hoffman.

Court Street, 1 four-st'y brick store and dwell., 25'2" x 60'; owner, P. Haggerty, 261 Warren St.; carpenters, M. Freeman & Son; masons, Burns & McCann.

South Third St., cor. First St., 1 nine-st'y brick factory, 58'10" x 98, and extension 22'4" x 41'2"; cost, $60,000; owner, Havemeyer & Elder; architect, T. A. Havemeyer; builders, Winslow & Janes.

Fifth St., 5 three-st'y brown-stone flats, 20' x 56'; and *Fifth St.*, 5 three-st'y brown-stone flats, 20' x 56'; cost, each, $2,000; owner, Geo. W. Brown, 728 Fulton St.; architect, C. B. Sheldon; builders, Levi Brown and C. E. Cozzens.

Prospect Pl., 2 four-st'y brown-stone flats, 20' x 65'; cost, each, $2,500; owner, Geo. W. Brown. 728 Fulton St.; architect, C. B. Sheldon; builders, Levi Brown and C. E. Cozzens.

ALTERATIONS.—*Broadway, No.* 771, two-st'y frame extension, 18' x 20'; cost, $1,600; owner, J. G. Jenkins, on premises; builder, John Brown.

Front St., No. 9 (Old Bank), raised two stories; cost, $3,000; owner, Thomas Messenger, Brooklyn Bank, builders, Charles Long & J. F. Wood.

Sidney Pl., No. 43, three-st'y brick extension, 9'6" x 15'; cost, $3,400; owner, Wm. Leissler, on premises; builder, H. D. Southard.

Chicago.

BUILDING PERMITS. — *West Madison, No.* 750, three-st'y store and dwell., for Walter Cahill; cost, $7,500.

Third Ave. No. 232, two-st'y dwell., for A. Mass; cost, $2,300.

Cor. of Dearborn and Sixteenth St., iron covered elevator, 73' x 36', for Stewart & Dougal; cost, $30,000.

Twenty-second St., No. 369, three-st'y dwell., for H. Schaffroth; cost, $6,000.

Cor. of Fisk and Eighteenth pl., two-st'y store and dwell., for Joseph Vistein; cost, $4,000.

Cor. Franklin and Adam St., five-st'y store, 184' x 160', for George Armour; cost, $170,000.

Eighteenth, near Paulina, two-st'y dwell., for John Dryle; cost, $2,000.

Monroe, near Loomis, two-st'y dwell., for A. W. Adcock; cost, $4,500.

New York.

ALTERATIONS. — *First Ave., No.* 141, store front and interior alterations on first story; cost $2,000; owner, Adolph Fuller; architect, Charles Sturtzkober; builders, Schaeffer & Sons.

West Thirty-seventh St., No. 534, to be raised to four stories; also three-st'y brick extension on rear, 25' x 102'; cost, $5,000; owners, Rohe & Brother; architect, Wm. Kuhles.

New St., No. 38, interior and exterior alterations; cost, $4,000; owner, The Stock Exchange; architect and builder, J. Richardson.

Sixth Ave., Nos. 90 *to* 98, an additional story on present one-st'y rear extension, also two-st'y brick extension, 103' x 32', also interior alterations; cost, $30,000; owners R. H. Macy & Co.; architect, James J. Lyons.

Avenue C., No. 81, two-st'y brick extension, 20' x 23'; cost, $2,500; owner, Mr. Folsom; architect, Chas. Sturtzkober; builder, John Kraft.

Twenty-third St., cor. of Fourth Ave., exterior and interior alterations; cost, $6,500; owner, The N. Y. S. for P. of C. to Children; builder, Edward Sorensen.

East Forty-first St., No. 4, one-st'y and basement brick extension, 15' x 45', to be built on rear; cost, $10,000; owner, Dr. H. B. Millard; architect, Wm. B. Bigelow; builder, Richard Deeves.

Fourth Ave., No. 81, to be altered internally; cost, $3,000; owner, John Willis; architect and carpenter, J. R. Coggin; mason, J. L. Murtha.

West Fiftieth St., No. 46, two-st'y brick extension on rear, 9' x 16'; cost, $2,500; owner, Mr. Holmes; architect, Stephen D. Hatch.

Twenty-third St., No. 26, front to be rebuilt, interior changes throughout; cost, $15,000; owner, W. P. Earl; architects, N. L. Le Brun & Son.

East Fourteenth St., No. 15, roof to be raised 4 feet; cost, $2,100; owner, W. Jennings Demorest; builder, James Coar.

Seventy-second St., for Helen Langdon, Chas. W. Romeyn, architect; J. J. Rudder, builder; 3 brown-stone dwells., 16'8" x 50'4", three stories and basement; cost, $27,000.

Second Ave., for Mrs. Helen Tracy, Jno. C. Burne, architect, 1 four-st'y brown-stone flats and store; cost, $12,000.

West Fourteenth St., Nos. 116 *and* 118, for Wm. C. Schemerhorn; D. Lienan, architect; Benj. Blackledge, builder; brick store, 50' x 106'6"; cost, $32,000.

Lexington Ave., cor. Sixty-fifth St., for Dominican Fathers, Wm. Shickel, architect, a brick convent, 88' x 49'; cost $75,000.

Lexington Ave., cor. Sixty-ninth St., for Sisters of Charity, a brick hospital, 74' x 50', Wm. Shickel, architect; cost, $50,000.

Seventh Ave., cor. Twenty-ninth St., for F. Beck, Geo. W. Da Cunha, architect, a six-st'y brick factory; cost, $50,000.

West Twenty-third St., Nos. 27, 29, 31, 33, *and West Twenty-fourth St., Nos.* 8, 10, 12, brick store for Arnold, Constable & Co., Wm. Shickel, architect; cost, $200,000.

Seventy-fifth St., for D. Hennessy, Thom & Wilson, architects, 4 brown-stone residences; cost, $60,000.

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First Ave., cor. Seventy-seventh St., for Joseph Schweneger, Jno. I. Wilson, architect. 1 brown-stone flat and store, 27′ x 75′; cost, $17,000.

First Ave., for Jos. Schweneger, Jno. I. Wilson, architect, 3 flats and stores, 25′ x 55′, of brownstone; cost, $45,000.

First Ave., same owner and architect, 3 brown-stone flats and stores, 25′ x 55′; cost, $36,000.

Fifty-fourth St., for Jno. Grant, Thom & Wilson, architects, brick tenement, 35′ x 40′; cost, $10,000.

Lexington Ave., for Thos. F. Fresey, Chas. W. Romeyn, architect, Jas. Frame, builder, 2 brown-stone dwells., 16½′ x 50′4″; cost, $18,000.

Tenth Ave., 1 brick two-st'y dwell., and shop, 25′ x 40′; John Dunning, owner; Peter Wagner, builder, cost, $2,000.

Art School.—A philanthropist of this city has bought some land on First Ave., between Sixty-sixth and Sixty-seventh Sts., on which he proposes to build a brick building one-st'y high on three sides of a court. It will have a frontage of 200 feet on First Ave., and a depth of 130 feet. The building will be lighted from the sides, and will have a gable roof. The main entrance will be on the avenue, and on either side will be rooms for the officers and managers. The gentleman proposes to give the use of this structure to the Trustees of the Metropolitan Museum of Art for three years.

Church.—Mr. L. B. Valk has filed plans for a new brick church, 68′ x 100′, for the Trustees of the Second Baptist Church of Harlem. The location is to be on the north-east corner of One Hundred and Eleventh St., and Lexington Ave. Cost, $30,000. Messrs. E. D. & A. Harrison, of Brooklyn, builders.

Factory.—Stephen D. Hatch, architect, has designed an eight-st'y brick building, 78′7″ x 101′, for Leopold Schepp, on Duane St. Estimated cost of the building is $150,000. John Masterson, builder.

Houses.—The foundations are now being prepared for Mr. H. R. Bishop's new house on Fifth Ave., its design has been drawn by Mr. C. W. Clinton. The exterior is to be of brown-stone, in Renaissance style. It will cover a lot 53′8″ x 90′.

Mr. Geo. Kemp will have a fine house built this summer on Fifth Ave., cor. Forty-eighth St. It will be built to harmonize with the old Dutch Reformed Church, and Mr. Soelet's new house.

Office Building.—The Liverpool, London & Globe Insurance Co., have cabled from the head office endorsing the plans of Mr. S. D. Hatch, for their new building, and estimates will be immediately called for.

School-House.—Mr. D. J. Stagg, has drawn plans for a brick school-house for the Board of Education, 125′ x 125′. Cost, $100,000.

Stores.—The site of the Olympic Theatre, which is to be torn down, will be covered with stores, designs for which are being prepared by Messrs. D. & J. Jardine.

Tattersall's.—Messrs. D. & J. Jardine will prepare plans for the N. Y. Tattersall's, on the corner of Fiftieth St. and Seventh Ave.

Philadelphia.

Houses.—*Fox St.*, 10 two-st'y dwells., 13′ x 41′, owner and builder, Henry H. Wister.

Hipple St., three-st'y dwell., 18′ x 46′; Charles Vogt, contractor.

Hamis St., 2 two-st'y dwells., 16′ x 40′; T. W. Wright, contractor.

Aspen St., cor. Forty-first, 1 three-st'y dwell., 32′ x 40′; John F. Meyer, contractor.

Division St., cor. Richmond, 1 three-st'y dwell., 20′ x 50′; Charles Fay, contractor.

Bainbridge St., 2 two-st'y dwells., 18′ x 54′; Thomas McCouch, contractor.

Twenty-fifth St., 6 thfee-st'y dwells., 15′ x 40′; J. L. Cane, owner.

Sixteenth St., three-st'y dwell., 22′ x 92′; James E. Smaltz, owner and builder.

Twenty-third St., 6 three-st'y dwells., 17′ x 49′; James M. Patterson, contractor.

Bower St., near Trenton Ave., 1 three-st'y dwell., 18′ x 32′; W. Steel, contractor.

Stores.—*Walnut St., No.* 1012, three-st'y building, 25′ x 49′; builder and architect, D. S. Gendell.

Market St., No. 930, five-story store, 20′ x 130′; James B. Doyle, Contractor.

Ridge Ave., No. 2109, three-st'y store and dwell., 18′ x 59′; T. A. Beaver, contractor.

Factories.—*Hamilton St.*, cor. Twelfth, three-st'y factory, 45′ x 110′; James McCartney, contractor.

Torpen St., one-st'y dye-house, 60′ x 32′; G. H. Bunkworth, contractor.

Front St., four-st'y factory, 50′ x 60′; W. Steel, contractor.

Stables.—*Mellon St., No.* 1123, two-st'y stable, 40′ x 53′; Patrick Olden, contractor.

Norris, cor. Thompson, two-st'y stable, 80′ x 400′; owners, Union Passenger Railway Company.

School-House.—*Poplar St.*, 1 two-st'y school building, 14′ x 37′; S. J. Rea, contractor.

Additions.—*Greene St., No.* 425, three-st'y addition to dwell., 18′ x 33′; George Glaystone, contractor.

Twenty-third and Brown St., addition to stable 100′ x 150′; owners, Union Passenger Railway Company.

Asylum.—Forty-eighth St. and Darby Road, three-st'y "Home," 72′ x 44′; Lewis Havens, contractor.

Insurance Building.—Mr. Theophilus P. Chandler, Jr., architect, of this city, has made plans for a new building for the Spring Garden Ins. Co., No. 431 Walnut St.

St. Louis.

Building Permits.—Eleven permits have been issued since our last report. Four of which, are for frame structures of slight importance. Of the remainder, those worth $2,500 and over, are as follows: —

Owners.	Use.	Stories.	Rooms.	Cost.
Grand Avenue Presbyterian Church	Church	1	1	$12,000

General Notes.

Adrian, Mich.—The State Reform School for Girls is to be built here.

Alleghany, Pa.—James McNally, clothier, will build a house to cost $18,000, on Bidwell St., the coming summer.

Altoona, Pa.—Messrs. Wilson Bros. & Co., architects, of Philadelphia, have just completed plans for a house 45 x 60, to be built for Mr. John P. Sevan. Cost, $15,000.

Bowenville, Mass.—Work on the new St. Joseph's Church has been begun by the contractors, Messrs. Hogan & Holmes, of Boston, on Monday.

Mr. Joseph McCreery, Superintendent of the Shove Mill, is building a cottage at the junction of Mt. Hope Ave., and Bay Street.

Bradford, N. Y.—Messrs. Holmes & Little, architects, of Buffalo, N. Y., are building a store; cost, $10,000.

Brattleboro, Vt.—Mr. W. H. Hayes, of Elmira, N. Y., is the architect of the New M. E. Church, which is to cost $12,000.

Bridgeport, Conn.—The Read Carpet Company are building a three-st'y brick addition, 50′ x 130′; John Rutherford, builder.

Plumb & Griffin are building a two-st'y brick pork-packing house.

Louis Kutscher is building a three-st'y brick block, 60′ x 50′, — three stores and tenements above; cost, $12,000; John Rutherford, builder; Lambert & Bunnell, architects.

Mr. D. T. Ellis, Treasurer of the Belknap Manufacturing Co., is to build on Cottage St., a three-st'y house, 40′ square; cost, $3,000; Palliser, Palliser & Co., architects.

S. M. Cate, Jr., is building a Queen Anne cottage, cor. Washington and William Sts.; cost, $3,500; Palliser, Palliser & Co., architects.

W. L. Wolfram has broken ground cor. East Main and Maple Sts., for a block of stores, 50′ x 75′, three-stories; French flats on second and third stories; pressed brick; cost, $9,000; Palliser, Palliser & Co., architects.

Builders are very busy, and mechanics scarce, and advertisements offering carpenters $2.50 per day do not bring the required help.

Camden, N.J.—The Pennsylvania Railroad Co. will soon build an iron depot, 160′ x 400′, at a cost of $50,000.

Cedar Point, O.—Mr. N. B. Bacon, of Toledo, O., is the architect of a huntsman's lodge, which is to be built here at a cost of $5,000.

Cedar Rapids, Io.—Mr. F. M. Ellis of Marshalltown, Io., is the architect of the new School-House, which is to cost $14,000.

Mr. Ellis is also the architect of the Episcopal Chapel, which will cost $6,000.

Chester, S. C.—Mr. Giles J. Patterson will build a house, stable, and outbuildings; cost, $4,500; Palliser, Palliser & Co., of Bridgeport, Conn., architects.

Dedham, Mass.—A keeper's house is to be added to the Norfolk County jail, four-stories high, and measuring 46′ x 50′. It will be of Quincy granite. Contracts not let. Mr. G. J. F. Bryant, of Boston, is the architect.

Denver, Col.—Plans and specifications are being prepared at the office of the Superintendent of the Denver Union Depot & R. R. Co., for the Union Depot, and will be ready for proposals in about thirty days. Size of building, 503′ x 65′; to cost about $300,000. Cross & Taylor, architects, of Kansas City, Mo.

East Hampton, Conn.—M. Curtin is building a cottage; cost, $1,000; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Elmira, N. Y.—Mr. W. H. Hayes, architect, has the following work on hand: —

Wooden dwell., for J. D. F. Slee, Esq.; cost, $8,000; S. H. Cotrell, contractor.

Wooden dwell., for Jas. L. Woods, E. A. Swan, contractor; cost, $5,000.

Library, dining-room, and other additions to residence of ex-Governor Robinson; cost, $15,000.

Additions to shoe factory, seven stories high, of brick and Ohio stone, for Mr. J. Richardson; cost, $5,500; also designes for two cottages for the same.

Gloucester City, N. J.—It is said that a large iron foundry will shortly be erected by Philadelphia capitalists, on Peysen's Farm, in the southern part of this city.

Gloversville, N.Y.—Hon. Levi Parsons, of New York City, has given $50,000 to establish a Public Library for Gloversville and Kingsboro, N. Y.

Higganum, Conn.—Mr. Hotchkiss, of the firm of Stevens & Hotchkiss, will build a house. Mr. Heman Mervin is putting up another tenement house. Mr. J. H. Freeman is to build one or two tenement houses this spring.

Hoboken, N. J.—The Hoboken Ferry Company proposes to build a new ferry-house on the Hoboken side, 225′ x 150′.

Mr. Wm. Kuhles, of N. Y., has drawn plans for a store and dwell., 25′ x 50′, and extension. five stories high, to be built of brick, at a cost of about $9,000.

Hornellsville, N. Y.—A house is building for C. Richardson, Esq., at a cost of $4,000; W. H. Hayes, architect, Elmira, N. Y.

Hyde Park, Mass.—Mr. Charles J. Bateman, of Boston. is the architect and superintendent of the new Catholic Church, 70′ x 130′. Foundations just commenced.

Jackson, Tenn.—J. L. Wisdom, Esq., is building a two-st'y brick house, 45′ x 60′; cost, $ 4,000; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Lancaster, Mass.—The Unitarians are to build a chapel.

Lancaster, O.—D. W. Gibbs, architect, of Toledo, O., is to furnish plans for the New Public Hall and City Library; cost, $35,000.

Lockport.—T. D. Ryan is building a two-st'y frame cottage; cost, $1,500; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Lodi, N. Y.—The New M. E. Church is to be built at a cost of $12,000, from the design of Mr. W. H. Hayes, of Elmira, N. Y.

Louisville, Ky.—E. D. Standiford is to build a three-st'y brick hotel, on the northeast corner of Tenth and Broadway Sts.; cost, $17,000; and also a two-st'y double brick dwell., on Broadway, between Ninth and Tenth; cost, $6,200; also a two-st'y double brick dwell., on Tenth St., between Broadway and Magazine; cost, $4,300.

Hugh Stafford is to build a two-and-a-half st'y brick building, on Reservoir Ave.; cost, $2,000.

George Nicholas is to build a two-st'y brick dwell., on Madison St.; cost, $4,000.

Lynn, Mass.—W. R. Melden is to build at Glenmere a cottage; cost, $1,500; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Manhattan, Kan.—Mr. W. H. Hayes, of Elmira, N. Y., is the architect of the new M. E. Church; cost, $8,000.

Milwaukee, Wis.—Plans for the additions to the Wisconsin Industrial School for Girls have been adopted. $10,000 will be spent on the improvements.

Marshalltown Io.—Mr. F. M. Ellis, architect, is building houses for Dr. McBride and Myron Woodard, costing $5,000 and $3,000 respectively.

Middletown, Conn.—A new building is to be built at the Insane Asylum.

Nantasket Beach.—On the Jerusalem Road is building a wooden house for Mr. H. T. Hyde, measuring 50′ x 60′. The foundation is in place, but the superstructure is not let; cost, $15,000; Messrs. Allen & Kenway, of Boston, architects.

Naples, N. Y.—A house is building for F. J. Cramer, Esq.; cost, $3,000; W. H. Hayes, architect, Elmira, N. Y.

Naugatuck, Conn.—Brown & Stilson, architects, of New Haven, are building a house for John Beebe, which will cost $4,000.

New Britain, Conn.—An effort is making to build a theatre.

Newcastle, Del.—Mr. T. P. Chandler, Jr., of Philadelphia, is architect for the Masonic and Odd Fellows' Hall, now being built.

New Haven, Conn.—Messrs. Brown and Stilson, architects, are building on Chapel and Howe Sts., a brick building for Joseph Parker, which will cost $15,000; a brick building for Mrs. Hadley, on Trumbull and Whitney Sts., costing $12,000; and cottages for Miss Spencer and H. Killam, Esq., which will cost $2,000 each.

Newton, Conn.—Work will be at once begun upon a new depot fo the Housatonic Railroad.

North Uxbridge, Mass.—The Baptist Church and Society are about to build a new church on Chase's Corner. The new church is to be of wood, two st'y high, 52′ x 76′, with a tower 80′ high; Mr. W. G. Preston, of Boston, is the architect.

North Pownal, Vt.—The North Pownal Manufacturing Co. has let contracts for building three tenement houses.

Osage, Ia.—Mr. N. A. Russell, architect, has in preparation plans for a brick building, cut-stone finish, owned and to be occupied by Sweeney Bros., and Libby, as a bank and real estate office; cost, $8,000.

Also plans for residence for Dr. J. L. Whitly, brick and terra-cotta; cost, $4,500.

Port Byron, N. Y.—G. W. Perkins is building a cottage; cost, $3,500; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Portland, Oregon.—The Oregon Railway and Steam Navigation Co., is building a dock 500′ long, and several elevators and warehouses; $100,000 will be spent in the improvements.

Quincy, Mass.—Mr. H. H. Richardson, of Brookline, Mass., is the architect of the Crane Memorial Hall, which is soon to be built here.

Richmond, Va.—The architect of the new temple of the Congregation of Beth Ahaba, on Eleventh St., is Captain Albert Lybrock.

Rochester, Ind.—The Methodists are ready to build their church.

Rushville, Ind.—Mr. D. A. Bohlen, of Indianapolis, is the architect of the church now building, at a cost of $8,000.

San Francisco, Cal.—At present the market prices of building material rule as follows: —

Rough Redwood	$18,00	₱ M.
Framing Pine, Oregon	18,00	"
Surfaced Redwood and Oregon Pine	26,00	"
Rustic Redwood and Oregon Pine	26.00	"
Shingles	2.50	"
Lath	1.60	"
Flooring, 1″ x 4″, tongued and groov'd	26.00	"

Scoharie, N. Y.—J. Wallace Marsh has broken ground for his new store.

Southington, Conn.—Ground is broken for the foundation of the Soldiers' Monument, and the dedication will take place on Decoration day, May 30.

Sterling, Ill.—A new municipal building is to be built.

St. Paul, Minn.—Mr. L. S. Buffinton has been chosen architect of the new Union Depot.

Streator, Ill.—Jas. G. Wilson is building a two-st'y store 50 feet front, with hall above, for the Young Mens' Christtian Association, F. S. Allen, architect; cost, $3,500.

Col. Plumb has given the School Board $25,000 and two acres of land, for a new High School, one room of which is to be for the use of the Ladies' Library Association.

Tracy, Minn.—The town has voted $4,000 in bonds for a new school-house.

Troy, N. Y.—Jonas S. Heartt will build a first-class house at 16 Second St.

Ground has been broken for a first-class house near the corner of Congress and Second Sts.

Troy, N. Y.—Plans have been prepared for Sutherland's new building, on the corner of River and Hulton Streets, Troy. It will be 150 feet long by 95 feet wide, and five stories high.

Troy, Pa.—Newberry, Peck & Co.'s new store is to be built by W. H. Hayes, architect, of Elmira, N. Y.; cost, $65,000.

Vincennes, Ind.—G. B. Henderson will build a cottage this summer; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Vinton, Io.—Mr. F. M. Ellis, of Marshalltown, Io., is building, at a cost of $5,000, a house for W. B. Watson.

Wabasha, Minn.—Mr. H. H. Jewell is building a large brick block.

Wallingford, Conn.—J. W. Spencer is building a house; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Washington Court-House, O.—The Masons are about to build a temple on the Yeoman or Music-Hall site.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE National Board of Fire Underwriters met last week in New York, and statistics were presented of much interest, differing also in some respects from those contained in the report of the Insurance Commissioner, to which we referred two weeks ago, and which perhaps misled us to some extent by including dividends among the expenses of the companies. The New York companies, it seems, paid a dividend of about eleven and a half per cent, on an average, which, it would appear by the Commissioner's statement, must have been taken from their capital, as the losses and other expenses equalled the premiums received. Perhaps some expert will help us out with our figures, as we should be sorry to misrepresent the companies or their business. Meanwhile, we note with great satisfaction that the Committee on Construction of Buildings complain of the unnecessary losses which our reckless habits of building bring upon us, and urge greater strictness in enforcing the building laws of the large cities, and more care in selection of those who administer such laws. They compare the losses in this country with those which are suffered in Europe, and instance with reason the dangerous condition of our great summer hotels. They disapprove, moreover, of very high buildings, and urge the construction of fire-proof interior work. All this is very hopeful, and we trust that the tendency toward mutual coöperation among the companies will take shape in a strong movement toward some of the reforms which are so clearly for the interest of the underwriters as a class, just as for that of the whole community, and that we shall by and by cease to hear the complaint, which is made in Europe as well as in this country, that the underwriters systematically discourage fire-proof building. It is noticeable that the amount of capital invested in the business has decreased some eight per cent within the year, and twenty-five companies have ceased operations altogether. What this indicates we cannot say.

THE Supplementary Report of the Boston Manufacturers' Mutual Insurance Company, or rather, its presidents, shows how a few individuals are working to bring about a better state of things, and, though addressed to manufacturers, is full of suggestions in regard to matters which are strictly within the province of architects. As the writer says, "if the interests of owners, occupants, architects, builders, and underwriters could be made identical elsewhere as they have been in mill-construction, seventy-five to one hundred millions of dollars a year, now wasted, would be saved to this country." And he proceeds to prove this, by showing how the modes of building found by experience best to combine cheapness with fire-resisting quality, and therefore insisted upon by the factory underwriters, have diminished the cost of insurance upon that very hazardous kind of risk from some two per cent per annum to a small fraction of one per cent,—much less than the rate which is imposed upon hotels, churches, school-houses and other buildings where danger from fire is, or should be, less than a hundredth part of that which exists in cotton-mills. The business of the Boston company in 1879 was more favorable than in previous years, partly from good fortune, no doubt, but still more owing to the thoroughness with which good construction has been enforced, and the result is shown in a total loss of fourteen thousand dollars out of forty-five millions insured; in other words, the losses were *thirty-one thousandths of one per cent* on the amount at risk. Let any architect compare his insurance policies on dwelling-houses, where one-fifth to three-tenths of one per cent is charged for structures always occupied and guarded, and free from accumulations of inflammable material, from the friction of machinery and danger of spontaneous combustion, with the cost of insuring mills packed with dry cotton, their atmosphere filled with floating fibres, which a little extra friction in the all-pervading machinery may set into a blaze, liable always to spontaneous combustion, which, with friction, causes half the fires which occur in factories, left unoccupied at night and on holidays, at which times seventy per cent of the losses occur, and reflect that in spite of these immense disadvantages the cost of insuring the mills is about one-fifth that of dwelling-houses, and he will be convinced that the underwriters have perfected a system of construction which is worth his study. It would be an injustice to a system so carefully worked out to attempt to describe it in a few words, and indeed most of our readers know something of it. If any do not, we hope to be able before long to give an adequate account of it; meanwhile, we will only quote Mr. Atkinson's brief conclusion, which is, that "the customary methods adopted by architects and builders, with a few conspicuous exceptions, are examples of all the faults to be avoided."

THERE is perhaps no way of making building laws so complete that a very considerable amount of discretion in making new rules, or dispensing with the old ones in special cases, must not be left with the officers who administer the law, and this discretion gives frequent occasion for criticism of officials who may have acted according to their best judgment. The Superintendent of Buildings in New York, Mr. Dudley, has suffered lately from the great amount of responsibility which the arbitrary power with which he is clothed compels him to assume. In one instance a permit was issued by the Department, in due form, for the erection of a wooden shed on a wharf within the building limits. This is plainly contrary to the law, but it is common to set aside the letter of the statute to permit the erection of temporary structures. However, in this case some parties interested in neighboring property applied for an injunction to restrain the parties who had obtained the permit from carrying out their plan, and the Superintendent himself appeared as a witness, saying that the permit, although issued from his office, was not signed by him, and was therefore invalid. To this the parties responded that their application was made at the proper place, in the manner provided by law, and that this permit was issued to them in answer, and that having fully complied with the directions of the statute, they could not be prevented from carrying out the work in the manner which had been legally approved. This argument seems hard to answer, and it seems to have prevailed. Perhaps the dissatisfaction of the losing party will lead to some amendment of the law, curtailing the arbitrary powers of the Department. Any approach to a more uniform standard will be much for the interest and comfort both of the officers of the law and the building public.

PROFESSOR BAIRD has made an application to Congress, which we hope will be successful, for an appropriation of fifty thousand dollars, to continue the ethnological researches among the North American Indians, which are now being prosecuted under the direction of the Smithsonian Institution. The sum asked for is very small, and it should not be difficult to obtain it. The opportunity for studying the subject will soon be gone, as the Indians who remain lose their ancient traditions under the influence of civilization, and insoluble as the problem of the origin of the North American tribes now seems, there is no knowing how soon some discovery, perhaps in Asiatic ethnology, may give a clue for pursuing which all the isolated facts which can now be gathered will be of the utmost importance. There is a peculiar fascination about the archæology of America, the history of Aztecs and Peruvians, and the still less known tribes of New Mexico and Arizona. All that we know is so strange, so unlike European antiquity, that the story of the conquest of Mexico, only three hundred years ago, reads more like the adventures of Jason in search of the golden fleece, than any less remote history, and yet these accounts, far from being mythical, or even improbable, are to be verified by myriads of buildings

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still standing, inscriptions, objects of every kind, perhaps even by the traditions of the descendants of Montezuma himself. Here and there some private collections have been formed of antiquities from the south-western territories, and from the tombs of the mound-builders, but these are of far less value isolated than they would be in their proper position in a complete series of American archæological illustrations, such as national enterprise could collect.

Architects in this country have little occasion to trouble themselves about bills of quantities, and it is quite possible that they have no reason to regret that our contractors generally prefer to depend either on themselves or on surveyors employed solely by them. In England, as is well known, contractors expect to be supplied with the quantities for work on which they estimate, and where the work is not important, it is very common for the architects themselves to measure up the amounts of labor and material, and thereby earn an additional two or two-and-a-half per cent beyond their regular commission. This extra fee is generally paid directly by the successful contractor to the architect or quantity-surveyor. Of course, he adds the amount of it to his tender for the work, so that the owner of the new building always actually pays it, and it would be much better if he were to be the visible as well as the virtual dispenser of his dollars, but this fee seems to be a difficult one to collect directly, and if owners prefer paying "through the nose," as the French say, to rendering a definite equivalent for a definite service, it is natural that the method should be adopted which attains the object with the least trouble. After all, the service is for the owner's benefit exclusively, for the simple reason that where quantities are usually furnished he cannot obtain tenders without them, and the comparison of a number of competing tenders forms his best means of getting his work done cheaply, so that the architect, if he acts also as quantity-surveyor, earns his fee just as honestly as by making plans and specifications. Unfortunately, however, the actual receipt of money from the builder gives the transaction an air of being a private arrangement between him and the architect, whereby he receives some benefit. In a case reported in the *Building News*, the judge was pleased to take a view of the matter, which, if not strictly in accord with the facts, had still an air of such high morality that it is likely to serve as a precedent. "No man," said his Honor, "can serve two masters." The relation between architects and contractors, he went on to observe, was such that the contractor could not get his payments without the architect's certificate, and he therefore "bought the architect over by paying him for his quantities." The counsel for the unfortunate defendant suggested that it was the universal custom of the profession in that locality, but this argument was disposed of with equal ease. "Customs," said the judge, "are not good unless reasonable, and there are some customs which are not reasonable because they are not just." All magistrates do not have the propensity for acting as witness, judge and jury at once, which some English ones manifest, but those architects who are tempted to add to their employment by acting as quantity-surveyors may do well to note the light in which their efforts are likely to be regarded.

Some valuable suggestions in regard to securing monuments of great men may be derived from a recent transaction in Philadelphia, the outcome of a situation whose peculiarities we explained in our issue for May 10, 1879. In 1825, it appears, some one collected fifty-six hundred dollars for the purpose of erecting a monument to Washington, and entrusted the money to a committee for investment. In the lapse of fifty-odd years the amount has increased to one hundred and thirty-seven thousand dollars. In a somewhat similar manner, the Pennsylvania Company for Insurance of Lives received in 1871, thirty thousand dollars from Mr. William Purves, trustee, for the Washington Monument fund, which is supposed to have also increased to about fifty thousand. The Society of the Cincinnati, thinking it a favorable time to secure the erection of the monument, have petitioned for a citation upon the insurance company, which has been granted, requiring them to show cause why they should not pay over the fifty thousand dollars, to be united with the one hundred and thirty-seven thousand, and the whole used in erecting a splendid memorial in Fairmount Park. We hope an agreement will be reached for the disposal of the two funds, and that Philadelphia will acquire an ornament worthy of her illustrious place in the history of the country. The idea of setting aside a small sum for a monument and letting it increase to a great one before the trophy is erected is, however, somewhat novel. We have heard of such funds which diminished instead of increasing; but this may be owing to their not having been in the hands of Philadelphia trustees. If such could be always secured, the posthumous glory of any ambitious individual possessed of a few thousand dollars would be simply a question of time, and any one who finds this generation ungrateful, and would like to exhibit himself in better style before posterity, has only to lay aside a certain sum in good hands, and a simple calculation will show him how soon compound interest will bear him up to immortality.

The schools of wood and metal work founded by some gentlemen in connection with the Metropolitan Museum of Art in New York, to which we lately referred, have, it is said, met with unexpected good fortune. Carried on last season in a small way, in rooms on Union Square, they proved that they were not only useful, but that their usefulness was appreciated by those for whose benefit they were designed. Encouraged by this, it is reported that a wealthy and public-spirited citizen of New York has presented to the Trustees of the Museum a plot of ground on First Avenue, just above Sixtieth Street, and has agreed to erect upon it a building of two hundred feet frontage, and one hundred and thirty feet deep, to be devoted to the use of industrial art schools. This gentleman's benevolence is as thorough as it is intelligent, for he proposes to fit up the schools complete with apparatus for class and shop work. Messrs. Atwood and Sandier are expected to be instructors in the new school, and probably four others will be employed, and two additional departments will be provided. It is intended to teach painting and the principles of coloring, as well as form. Students will be admitted between the ages of sixteen and twenty-five, and prizes will be offered for successful effort. The building is to be erected this summer, ready for the opening of the schools in December, and it is thought probable that the Union Square school will be also re-opened, as a branch of the larger one. The enterprise will be under the supervision of the Trustees of the Metropolitan Museum, and its future expenses will, no doubt, be partly defrayed from the Museum funds, but the generous donor of the building proposes to pay the cost of maintenance himself for the first year. It would be difficult to over-estimate the good which may flow from this noble liberality. If he who has undertaken to offer it has the opportunity of observing but a small portion of the benefit which he bestows upon his fellow-citizens, it is hardly possible to doubt that he will feel himself amply repaid for his sacrifice.

The Pullman Palace Car Company proposes, in its new manufacturing establishment near Chicago, to set an example for other proprietors of large factories. It has secured one hundred and fifty acres of land, bordered on one side by the Illinois Central Railroad, and is to lay it out like a park. A drive two miles in length is to encircle the grounds, which are to be planted with shrubbery and grass, and the whole is to be enclosed by a wall. Between the range of shops and the railroad is to be a garden three hundred feet wide. The actual workshops will cover nearly eleven acres, and a tower a hundred and forty-six feet high will form the centre of the group. The huge fly-wheel of the Corlis engine is to be arranged so as to be conspicuous from the railroad, a novel but by no means ineffective decoration to the mass of buildings. Cottages for the workmen will be scattered about the grounds.

Those unsuspecting persons who engage in competitions for public buildings, will be interested in a little piece of evidence sworn to by the architect of the celebrated Cook County Court House, at Chicago. A certain contractor having sued the County for the amount of a bill of extras, this architect was put upon the witness stand. Incidentally, he was examined to show his *animus* toward several of the parties concerned in the suit; and, according to the report of the Chicago *Inter-Ocean*, which we hope was libellous, he testified that he had paid two of them for their influence in securing him the position of architect of the structure. This would appear to introduce a new element into the determination of the relative merits of the architects who compete for public buildings. Once the main question was, Who makes the best design? Gradually this has become complicated with another, — Who will furnish plans for the least money? And now, we may expect to hear a subdued undertone of inquiry, "Who will pay most liberally for 'influencing' his appointment?"

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VENTILATION OF BUILDINGS.[1]—IV.

THE various methods of heating buildings which are in general use in this country have each their special uses and advantages. A proper selection or combination for any particular place requires some attention to be given to these different methods. Open fire-places are very wasteful of heat, and as a sole dependence are in this climate entirely inadequate for any purpose except single rooms of a limited extent. When used in connection with other methods of heating, they become a valuable auxiliary. The heat is imparted from them by radiation, which does not heat the air at all, except by first heating the walls and surfaces with which the air comes in contact; thus a degree of comfort is attained without over-heating the air. The sun heats the atmosphere in a similar way, — by first heating the surface of the earth, which imparts heat to the air by contact. Moreover, the open fire is a valuable help in removing vitiated air from a room, and is therefore particularly useful in hospitals and other sick-rooms. In a room that is occupied by women and children, and by men of sedentary occupations, and is heated by hot water, steam, furnaces, or stoves, a higher degree of temperature is required for comfort than if a small open fire is used in connection with the other means. Moreover, all rooms that are heated exclusively by currents of warm air that have passed through heating apparatus give a higher degree of temperature near the ceiling than near the floor, tending to heat the head warmer than the feet, a very unsatisfactory state of things, which is partly corrected by the open fire.

If without an open-fire we demand in this climate that the air should be heated to 70° or higher, while if supplemented by a radiating fire it is equally comfortable and much more conducive to health to keep the air about 10° cooler, *i. e.*, if the fire shines on us, the desired heat of the body is maintained without heating the air above 60°. When wood fuel was abundant, fifty years ago, scarce any other means were employed for heating dwelling-houses. The result was not satisfactory, for the influence of the fire was hardly felt beyond the room where it was kept. The fire might be too hot for comfort near by, while on the opposite side of the same room ice might be forming. When wood became more scarce and anthracite was first introduced in our houses, economy and ingenuity devised various kinds of close stoves which, while very saving of fuel, overheated the air without providing for its renewal. The result was a detestable degree of closeness, with loss of vigor, pale faces and dyspepsia among the family. Later came the furnace in the cellar, which is only a large stove for heating rooms above by a circulation of hot air through pipes. The advantages of this method as compared with detached stoves are chiefly in the introduction of a constant flow of fresh air, if taken from a proper place, supplied to various apartments at will, heated to a comfortable degree; and a saving of labor by concentrating the fires in one place.

This was a considerable advance on the detached stove system, provided the air was allowed a way to get out of the room after being vitiated. In fact, for dwelling-houses of small capacity this method, when properly regulated and proportioned, and supplemented by small open-fires in the rooms that are constantly occupied, leaves little to be desired. The whole house can be thus kept at a temperature of about 55° or 60°, while the rooms most occupied are heated to about 65° and thus made quite comfortable by small open-fires of wood or soft coal. These heat the inmates without heating the air as above explained. There is but little doubt about the lower temperature being most healthful, provided comfort is attained, for the breathing of cool air is far more conducive to physical vigor. Even invalids gain strength and can be made quite comfortable out of doors with the thermometer at 50°, if well clothed and exposed to the sunshine while sheltered from the wind. In order to get good results from a heating furnace, regard must be had to the following: first, ample size for the fire-pot, and extended heating surface, so that the needed volume of air can be *warmed* without the iron becoming red-hot and *overheating* the air. It should never be over 100° to 110° F. when introduced into the rooms. Second, ample-sized pipes, proportioned to the sizes of the rooms. No definite rules can be given for these sizes, which should be adjusted to the exposure of the room as well as to its size, particularly in a country-house.

The management of the fire demands more judgment and foresight than is often bestowed upon it in the changeable weather of our climate. Anthracite fires are very convenient in this respect, that they do not need frequent attention to keep them alive; but if an equable temperature is to be maintained in the house, this fuel is so slow to ignite, and so slow to burn away, that some foresight must always be exercised in controlling the draught. A great variety of patterns for such furnaces are offered in our market. Their relative merits depend more upon the quality of workmanship and their strength, than upon the particular kind of material. The strength and conductive power of iron render it almost the only material, though soapstone is used to a small extent. It is desirable to keep the joints tight, of course, to prevent the diffusion of the gases of combustion into the hot-air chamber that is to supply the house. For this end it is found that horizontal joints are better adapted than vertical ones in cast-iron. Wrought-iron has been considerably used of late, with tightly riveted joints. When new, it is doubtless a tighter material than cast-iron; but it is more perishable, and quite as likely to change its form and work its joints open by alternate heating and cooling, so that its superiority is not yet fully established by experience. The permeability of cast-iron to the passage of gases is due more to the *quality* of the metal than to its fusibility. There is no more difficulty in making cast-iron impermeable to gases of combustion than for steam, and it is used universally for steam-pipes, and to some extent for boilers also, under a thousand times the pressure that can ever exist in a stove with an open smoke-pipe. In order to avoid the chance of furnaces leaking gas, the exit for smoke and gas to the chimney should be ample in size and unobstructed by dampers. Such dampers should be forbidden by the Board of Health. If the draught is to be checked to reduce the heat of the fire, the smoke-pipe should never be reduced in capacity. The proper way is to close the orifices *below* the fire, and exclude the air from the grate. In order to accomplish this more effectually, the fittings for doors below the fire should be made heavier and firmer than they now are, and carefully fitted by planing the joints, so as to control the flow of air into the fire.

It is found to be difficult to get satisfactory results in distributing heated air by horizontal pipes to a greater length than ten or twelve feet from their origin, particularly when the room to be heated lies to the windward of the furnace, in extreme weather. When houses are expanded in size beyond the limits that can be thus served, two furnaces serve the purpose better than one. But in larger mansions, and in large stores and public buildings, the practice of heating by steam or hot-water pipes has many advantages. The heat can thus be carried horizontally for long distances, the only limit being the loss on the way by escape from the pipes to the surrounding medium. This is checked by *lagging*, *i. e.*, covering the pipes with a non-conducting material like felt or asbestos. The process of heating buildings by steam has had a considerable development here of late, but without a proper regard, in most cases, for the provision of fresh air that is needed in the rooms to be heated. The process known as that of *direct* radiation ignores the introduction of fresh air entirely, leaving it to the chance cracks and openings and pores in the walls. Of course this cannot be recommended, and if exclusively used will be productive of much discomfort and ill health.

It is cheaper, of course, to conduct the steam by small pipes directly to the room which is to be warmed, and there to deploy it by pipes or other forms, to give the desired surface for radiation, — as it is erroneously called, — and omit the introduction of fresh air. We accordingly find all the earlier attempts to heat buildings by steam were on this principle, this building included. But more recently the demand for fresh air reached the ears of the manufacturers of the apparatus, and we have now what is called the indirect method, which, though not quite so economical of coal, is more conducive to health. The ordinary process is to ramify the steam-pipes in the basement at some convenient point under the room to be heated, to introduce outer air around the coil in ducts, and thence up into the room. A large amount of fresh air can thus be introduced and propelled to the desired place. If more heat is needed after supplying the desired quota of air, this heat can be supplied by placing a steam-coil in the room. The terms radiator and radiation are misapplied, because the pipes are rarely heated so much above the surrounding air as to impart much heat by radiation; moreover, radiant heat passes *through* air. The air in contact with these pipes becomes heated by such contact, and, being expanded, rises, to be replaced constantly by other air, keeping up a circulation till all the air within reach is warmed. This process is sometimes called convection. It has generally been supposed that steam-pipes cause no risk of setting fire to wood, since the steam is rarely used with much pressure, 5 lbs. per square inch being a moderate limit, and 10 or 12 lbs. being rarely exceeded. The temperature of steam at a pressure of 5 lbs. per square inch is 228° F., while at 12 lbs. it is 244° F. But it has been found that even this temperature, if constantly applied for long periods, will partly burn the wood — reducing it to charcoal so void of moisture that it is very combustible. Whether or not actual ignition has occurred without further stimulus is not definitely known. But since it is not desirable to char the wood in any part of our buildings, the steam-pipes should not be placed in contact with it.

Concerning the best height in the room to introduce the fresh air and to remove the foul air, much difference of opinion exists among experts, and some heated discussion is to be found on the subject. I can only say that there are plenty of examples where fresh warm air is introduced near the bottom, and the foul air removed above; and other examples with the flow of air in the reversed direction. For ordinary use in private houses, the introduction of the fresh air near the floor is the simpler method. The extraction of the foul air near the floor can only be effected by special apparatus contrived for the purpose, with some aspiratory or mechanical force to move it; while, if the foul air be taken from the top of the room, its higher temperature as compared with the outside air will generally provide for its motion. In the Annen Real Schule at Dresden (described by Dr. Lincoln in Buck's Hygiene) the upward movement is used in summer, when the heat imparted to the air by the children assists, and the downward movement in winter, assisted by aspiration chimneys. In the Hall of Representatives at Washington and in the Boston City Hospital are found two quite successful examples of the upward movement, and in the *grande salle* of the Trocadéro at the Paris Exposition is a good example of the downward system. This hall seats five thousand persons. The air is furnished by a fan, at the

[1] A lecture by Mr. Edward S. Philbrick, C. E., delivered before the students of the Massachusetts Institute of Technology.

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rate of 40 cubic metres per hour for each person, or 200,000 cubic metres in all per hour — about 2,000 cubic feet per second. To avoid throwing the whole burden of movement upon the propelling fan, however, which might produce an inconvenient compression, the duty of movement is shared by an exhausting fan, that draws the foul air from five thousand openings in the floor.

Concerning the comparative merits of heating by steam and hot-water pipes, there is some difference of opinion, but the facts seem to be as follows: That hot-water apparatus may require a more costly plant, but is more economical of fuel when used for buildings of considerable size. Moreover, since water is not usually heated above a temperature of 200° or thereabouts in the boiler, the heating surfaces are limited to 160° or less, which is better than the higher temperatures generally used for steam-pipes, a greater surface being used to do the same work. The hot-water apparatus is simpler, and the quantity of heat needed in any particular apartment is controlled by valves in the pipes, that check the flow without entirely stopping it; while with steam we must have the whole or none, and the whole, with a temperature of 212° or more, is often hotter than we wish. The regulation of temperature where steam is used is therefore effected by providing for a supply of cool air, to be mixed with the warm air in the pipes before coming into the room. This system requires very careful adjustment, and is not easily managed.

Dr. J. S. Billings, in a report on the ventilation of the Johns Hopkins Hospital, says: "From practical trial with the hot-water method, I am perfectly sure that for heating purposes it is entirely satisfactory, and is probably cheaper than steam." Dr. Billings goes on: "My attention has been called recently, however, to a very successful application of steam-heating in the new wards of the Boston City Hospital, according to the plans and under the direction of Dr. Cowles, the superintendent. From information furnished by Dr. Cowles, and from my own observations, I believe that this method gives satisfactory results: results, so far as temperature and ventilation are concerned, as good as, but no better than, the hot-water system."

Dr. Billings quotes the following from a report of Surgeon D. L. Huntingdon, U. S. A., upon the heating and ventilation of the "Barnes Hospital," at the Soldiers' Home in Washington:—

"The total space to be heated is about 310,000 cubic feet. The heating is effected by a low-temperature hot-water apparatus, consisting of two tubular boilers each nine feet long, and forty-two inches in diameter, with connecting mains, pipes and coils.

"The heating coils, composed of cast-iron pipe, are placed in brick air-chambers in the basement, at the sides between the windows. At the point of entrance of the supply to each coil is a valve, by which the supply may be diminished to any degree, and the temperature of the coil regulated accordingly.

"From the above coils, pass the flues for fresh-air supply. These flues are of terra-cotta pipe, built into the walls. In the lower wards the flues are so arranged that the fresh air can be admitted either near the floor or near the ceiling. After a fair trial, it appears that the lower registers are to be preferred. When the air is admitted at the top, the ward is heated unequally; a series of observations showing a difference of from 10° to 12° between the floor and ceiling, and the patients complain of cold feet and discomfort, for which reasons the upper registers are not in use." "The apparatus has given great satisfaction, has maintained a pleasant, even temperature of about 70° in the coldest weather, and permits of changing the temperature at any locality, easily and rapidly. Many such changes are made each day by the engineer, to meet the varying circumstances of winds, changes of temperature, etc."

When providing for the ventilation of large buildings used for halls of assembly, theatres, legislative-halls, etc., it is often found that the amount of heat needed for comfort is inadequate to give motion to the quantity of fresh air needed for the number of persons who breathe it, particularly when we consider the heating power of the persons themselves, and the quantity of vapor given off by their lungs, which, as mentioned before, renders a lower temperature desirable than in a dry air. Moreover, in halls that are to be occupied for many hours, as for legislative bodies and courts, there are many days in the year when scarce any heat is needed beyond what is imparted by the inmates, and when the outer air is too cool to allow a free circulation through windows, etc. There are also many more days, in summer, when there is too little wind to effect the necessary change without artificial help, and when the supply of air is needed for its cooling effect upon the overheated assembly. In all these cases, artificial propulsion must be resorted to, either by aspirating shafts, to remove the air from the room forcibly, allowing the fresh air from the outside to take its place; or by *pushing* in the latter by fans or other blowing apparatus. Both of these methods are sometimes used together.

The use of the aspiratory and propulsory systems, separate and combined, is fully set forth in the report of Surgeon D. L. Huntingdon, before alluded to, and I will close the subject by liberal extracts from this report describing one of the most successful attempts at ventilation of which we have record.

"At all times when the building is not thoroughly ventilated by natural means (open windows), fresh air is supplied by means of a vertical air-shaft, placed at the west of the Hospital building at a distance of seventy-four feet. This shaft is thirty-eight feet in height, with a diameter of eight feet, open at the upper part, and protected from the weather by louvre blinds. A large weather-cock or vane placed above it turns a hood or cowl within the shaft, which tends to throw the current of air forcibly downward." This shaft seems to serve the same sort of purpose as the wind-sails on steamships, while its height secures an undoubted purity of the air. "This shaft at its lower extremity connects with a brick air-duct 286 feet in length, which passes under the basement of the building through its entire length, giving off, at intervals, lateral branches, which pass into brick air-chambers, within which are placed the coils connected with the heating-apparatus, and finally terminating in terra-cotta flues distributed to the several wards and rooms above. At its throat this air-duct is eight feet high and five feet wide, but steadily decreases in size in its passage under the building, until at its extremity it is reduced to two and one-half feet in height by two feet in width.

"At the throat, the amount of air passing into the duct, and thence into the building, is regulated and measured by folding-leaf doors. This duct is kept perfectly clean and pure, and arrangements exist by which moisture may be supplied to the air in its passage." The quantity of air passing into the building through the duct varies of course with the direction and force of the wind, and with the greater or less activity with which the air in the interior is removed by natural or artificial modes of ventilation. Repeated anemometrical observations show the velocity of the air current through the throat of the duct to average from 50 feet to 800 and 900 feet per minute, the latter quantity during the prevalence of high westerly or northwesterly winds. The removal of foul air from the interior by aspiration is effected by means of two large chimneys in the main building. Each chimney has an elevation of ninety-six feet, four feet four inches by five feet eight inches area inside, and is protected from the weather by a cap with open sides. A boiler-iron flue two feet in diameter passes up the centre of each chimney to a height of three feet above the cap. Into these flues pass all the products of combustion from the several furnaces, range, and other necessary fires, materially assisting the upward draught in the chimneys. At the base of each flue is placed a fire-grate for the purpose of producing an upward current when from natural causes the chimneys fail to act. Into these chimneys open all the ducts which receive the foul air from the wards; these ducts, or foul-air boxes, fifty feet in length, 3 feet 3½ inches wide, and 12 inches deep, are placed above and below each ward, and communicate above and below with the ward, by means of accurately closing registers. These foul-air boxes are lined with tin, and are cleaned daily. In each ward, and above each gas-burner, is fitted a three-inch tube, terminating in a funnel-shaped cup through which all air rendered unfit for respiration by the burning gas is discharged into the above-named ducts. Each ward contains twelve beds, is fifty feet long, twenty-four feet wide, and fifteen feet high, equal to 18,000 cubic feet. Both fresh and heated air are introduced into the wards by a similar set of inlets. In each of the lower wards these inlets are sixteen in number, eight of them being placed ten inches above the floor, and the other eight ten inches below the ceiling. This double set was arranged for experimental purposes, to determine if possible the best position for warm-air registers for heating and ventilating. The ventilation of the urinals and water-closets of each ward is effected by connecting them with the chimneys seventy feet high, at the end towers, and in which a constant current is maintained by fires used for heating water.

"The experience gained by daily observations continued over rather more than one year, on the subject of the practical working of the aspiratory system, goes to show that the movements of air currents are exceedingly diverse, and that the conditions presented at one time and those at another give widely different results. A high barometer and a low relative humidity, with either high or low temperature, seem to be the first essentials for satisfactory unassisted aspiration. As the relative humidity increases, the aspiration flags, and on days with the barometer below its normal average it becomes necessary to employ assistance to the aspiration. The direction and force of the winds have shown themselves to be important factors in the matter. . . .

"Under the conditions of unassisted aspiration the upward movement of the air in the chimneys, as determined by the anemometer, has ranged from a barely perceptible current to 387 feet per minute.

"With brisk fires at base of the chimneys, and an average temperature within same of 82° F., the highest recorded observation is 700 feet per minute.

"As a practice only one set of ventilating outlets is kept open in each ward, and under these circumstances each chimney will remove about 138,000 cubic feet per hour from the two wards connected with it.

"For the main inlet-duct for fresh air it has been found in practice that an average flow of 60 cubic feet per minute gives the most satisfactory results, and it is the endeavor to maintain about this velocity by the natural movements of air, if possible, or if this fails, by mechanical means, as by the fan or assisted aspiration. The average rate of movement into the inlets of the wards is about 130 feet per minute.

"About 250,000 cubic feet of fresh air are passed into these four wards per hour, or about 5,200 cubic feet per man per hour. With the above-named velocity the air passes into the rooms well broken up by its passage through the ornamental gratings of the registers, and is diffused without draught. . . .

"Propulsory ventilation is effected by means of a fan placed in a separate building 74 feet west of the hospital. The fan is an iron disk, 8 feet in diameter, with twenty-four blades 12 inches wide,

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driven by a six-horse-power engine. It is supplied with air only through the air-shaft. The boilers and furnaces are separated from the air-duct by two close doors, rendering it impossible for any smoke or coal-dust to enter the general circulation. The consumption of coal, when in use, is 140 lbs. coal per day.

"At this hospital we have made no continuous use of the fan, using it in summer during the warm stagnant mornings and evenings to create a draught throughout the buildings, and during the cooler weather to 'blow out' the building, and to assist in the ventilation of the wards. It is also used to regulate the temperature of the wards, as by its means we can speedily cool off overheated rooms, or in dull, damp, and cool weather it is usefully employed forcing warm air through the building. . . .

"From what has already been said it will readily be seen that one system blends almost imperceptibly into the other. The three methods may be put in operation at the same time. A very common combination is that of propulsion with aspiration, and the end attained by such combination is still better ventilation than is attained by either alone.

"For more than a year the ventilation of this hospital has been closely watched. Almost daily observations have been made upon the practical working, and the best methods of regulating the machinery have been carefully studied. It is my belief that a very close approach has been made to perfect success.

"Simple and natural as are the laws upon which the supply of fresh and the discharge of foul air are based, and little complicated as is the apparatus, intelligent oversight cannot be dispensed with. I cannot help again expressing my satisfaction with the fan. By its means I hold the power of, as it were, deluging the house with fresh air at any moment, and I am convinced that were the provision for the discharge of foul air far inferior to what it is, the use of the fan for a few minutes hourly would maintain a very satisfactory condition of ventilation."

Thus we see that the ventilation of our dwelling-houses is a matter, governed by laws that are readily understood by all. It should therefore be removed from the realm of mystery where it has been kept so long, and dealt with by a little common sense. Nature has made the aëration of our blood one of the highest and most important functions of life, giving to the organs concerned in that process the monopoly, or at least the lion's share, of space in the whole bust, and defending them by an arm on either side. Man should respect this function by lending it all the coöperation that intelligent attention can afford. Architects should study the subject, house-keepers should give it their interest, for none of us can live for even five minutes without the active exercise of this function.

SPRING EXHIBITIONS AND PICTURE-SALES IN NEW YORK. — II.

LET us look now at the Academy walls, and note whatever attractive and estimable works were there to be found. I do not think it is an injustice to any other to mention first in such a connection a portrait by Mr. A. H. Thayer (No. 533). It was the bust of a young girl, painted simply for the sake of the original, and with absolutely no accessories in the shape of "decorative" dress or background. It was as lovely in its way as the artist's landscape in the other exhibition, as poetical and fresh, and painted with as graceful and individual a brush. Mr. Fuller's portrait of a boy (No. 239) was very clever, and bore the impress of greater actuality than is usually the case with him. Mr. Weir's large portrait (No. 441) was not quite as interesting as his other works this year. Mr. Frederic P. Vinton showed a fine portrait (No. 435), full of life and style. Mr. William Page's strong portrait of General Grant, painted at the close of the war, deserved a more appreciative study than one could give it in the dark corner where, in spite of its being one of the most important pictures in the exhibition, and contributed by a man who is surely entitled, more than most, to all courtesy at the hands of Americans with any gratitude to the pioneers of true art among us, the committee had seen fit to hang it. Mr. Douglas Volk's portrait, In the Studio (No. 454), startled one at first by the boldness of its composition, and the strangeness of its yellow background. A little observation showed, however, how cleverly much of it was painted, and the whole canvas, by its very unconventionality, bore witness to Mr. Volk's talent, which is incontestable, though as yet undisciplined. Mr. Beckwith's portrait (No. 165) of a lady in a riding-habit was clever enough to have been more pleasing. What is it in this artist's work that repels us so often, alike from the painter, the sitter, and the practice of portrait-painting in general? Is it, perhaps, an accent of insincerity which pervades the whole, and convinces us that the artist has not been "in earnest with his art"? Even his clever brush-work, and the relief which he obtains thereby, strike us as affected, overdone. There is a disagreeable German word, *effecthascherei*, which they invariably suggest. With these few numbers, and Mr. Maynard's well-drawn, if not very attractively colored Musician, we have come to the end of the portraits in this exhibition which attracted notice for any strictly artistic quality whatever. The average run of the Academical work we know so well was not as good as usual. Mr. Hicks, Mr. Jared Flagg, Mr. Baker, Mr. Le Clear, Mr. Loop, Mr. Julian Scott, had all done their worst, and Mr. Huntington, comparatively speaking, the worst of all. His No. 170, called Elizabeth Princess, whether a portrait or an ideal subject, was especially poor, carrying us back to the very earliest style of Academy painting. Mr. B. C. Porter showed a more ambitious portrait than he had yet sent to the Academy; but not, I think, a better one. The former sweetness of color was gone, and no additional strength gained in its place. The textures were harder than before, and the attempt at a decorative *ensemble* was scarcely successful.

There were but few interesting figure or *genre* subjects in the exhibition apart from the portraits properly so called. Mr. Fuller's large Quadroon was a little disappointing, only because one compared it involuntarily with his beautiful Romany Girl of last year. Mr. Beckwith's Under the Lilacs was successful in the decorative result of a rather daring combination of colors, but was meretricious and a little vulgar. Mr. Eastman Johnson's Cranberry Harvest was to be praised for everything except composition. Mr. Eaton's Grandmother and Child deserved mention, as did Mr. Kappes's pictures, inferior though they were to his work in water-color. I believe that Mr. Wilmarth is still at the head of the Academy's schools. One was driven to regret it in the face of such a picture as his Pick of the Orchard. One hated to believe that there were worse pictures in the place, but found them, perhaps, in such as Mr. Bellows's Into the Sea, with its impossible composition, and its two figures falling quite out of the canvas, and Mr. Lambdin's Gradus ad Parnassum, in which it was hard to say which sinned the most, drawing, coloring, or sentiment. Mr. William H. Beard's pictures were not simply inartistic this year, not simply calculated to amuse those who care to look at attempts to satirize humanity expressed without truth to animal nature or regard for the elementary principles of art. It is not pleasant to cite works for the purpose of saying that they are as bad as they possibly could be; but it is sometimes necessary when they are signed by names whose long familiarity and magic "N. A." persuade a docile public to accept and admire without question. Such a public could not fail to be contaminated by such a picture as Mr. Beard's Bulls and Bears in Wall Street, hung on the line, and marked in the catalogue as worth $6,000. It was, I suppose, to be called an allegory, for while the scene was copied from reality, it was filled with real beasts pursuing avocations supposed to be typical of those pursued by their human namesakes, — tearing and rending and scoffing at one another. The details with which this humorous conception was worked out were equally childish and repulsive. Mr. Beard is probably better able than his critics to gauge the wants of his public, but one would rejoice to be sure that such a canvas as this would never find a place in an American home. It should require no knowledge of the rules of art transgressed therein to make it a disagreeable object to contemplate.

Let us pass now to the landscape art upon the walls, after noting for their good points Mr. Selinger's White Turkey, Mr. Baldwin's sketch of an Oriental Potter (No. 65), Mr. Ebner's Hungarian Fortune-teller, and Mr. Witt's Rags (No. 446).

Mr. Clement Swift's large shore view (No. 411), called a Waif of the Sea, was interesting and well painted, but by no means as striking or powerful as his Wreckers of last year. Nor was Mr. Harry Chase's Herring Fishers of Scheveningen as important as his picture in the other exhibition. Mr. W. S. Macy's canvases were as good as usual — somewhat better, indeed, as he proved by them that he could get out of the rut of spring-like foliage and heavy skies in which he had been running till one began to fear for his ability to do anything else with his very clever brush. A Forest Scene (No. 32) was very good, and a small Winter Twilight (No. 547) most admirable. Mr. Tiffany also appeared to advantage, especially in canvases of a *quasi* decorative character like No. 432, representing a hillside path in Algiers, the foreground filled with some cactus-like plant. Mr. Hugh Newell's landscapes with figures showed strength, and their color was better than in his *aquarelles* of similar subjects. Mr. Francis Murphy's style and sentiment, on the other hand, seem rather better suited to the more delicate medium, though his sunny and thoroughly artistic little pictures were a most refreshing contrast to the bulk of their surroundings on these walls. Mr. Bunce succeeded in getting color almost as rich as his Venetian tints out of home materials in his Watch Hill (No. 190). One realizes the beauty of those Venetian things of his, by the way, in looking at Mr. C. C. Coleman's Venice, Ancient and Modern, and especially at Mr. Bunner's Morning in Venice (No. 364), which had no good painting to redeem its composition, the artist having apparently thought it necessary to try and bring into one canvas samples of every sort of boat and building Venice had ever known. Mr. Bierstadt in his Turquoise Sea had evidently tried to show how vivid and apparently translucent a color he could produce with opaque pigments. He certainly succeeded in stunning us with the result. Need I say that his process had been one which transgressed all rules, and that the picture was about as much like a true work of art as a "Catherine-wheel"? It has been more than once remarked that if Mr. Bierstadt wished us to believe in the possibility of any such brilliant wave as this, he should at least have put the sun in the sky instead of a thunder-cloud.

Mr. Samuel Colman, Mr. Swain Gifford, Mr. Farrer, Mr. Quartly, Mr. Sartain, Mr. Edgar Ward, Mr. Wyant, and Mr. Carleton Wiggins, all showed good work, though not above their usual average. Mr. Hopkinson Smith exhibited one number (579) which showed that his skill extends outside of the management of the water-colors with which he was so successful this winter. Mr. Reinhart's Long-Islander (No. 599), was an excellent little beach study, and from

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Mr. Foxcroft Cole we had good work in a large picture of sheep, (No. 449). One is always glad to welcome Mr. Hennessy, who has been rather a stranger of late years. His Normandy coast-scene, Waiting for the Boats, was a good example of his skill, true and poetical at the same time in feeling, and pleasant in tone, if not remarkable for strength. A new name was that of Mr. Thomas Allen, Jr., of Pittsfield, Mass., who showed a strong, large landscape with cattle, praiseworthy in many respects but especially in the matter of composition, — or of conception, if that word be preferred. How few of our painters understand the very elementary fact that Nature does not arrange all her bits for pictorial effect, and that more is necessary to the planning of a good landscape than the mere enclosing of any given portion of the earth's surface within the limits of a picture-frame? How few of them even attempt any subtleties of arrangement such as make the pictures of the Frenchman Jacque, for instance, a perpetual pleasure to the eye? It was all the more agreeable to find a young man like Mr. Allen showing a perception of these things.

One of the most peculiar pictures in the Academy, and therefore one of the most attractive by contrast with the mass of commonplace about it, was, without doubt, Mr. Dewing's Morning (No. 373). To me it seemed noteworthy for more reasons than this. Many agreed with me, I am sure, in finding it eminently poetic and charming, while, on the other hand, even those of us who admired it most could, perhaps, understand how to others it seemed to border on the ludicrous. It was not poetry of the lyric, dramatic, or simply idyllic sort, appealing to every class of minds alike and finding sympathy in every observer possessed of any imagination whatever. It was more like some bit of French verse full of odd conceits and conscious archaic flavors. There are those for whom Mr. Rossetti's poems, to make another comparison, strike only a ludicrous chord. They are easily parodied, and so would be Mr. Dewing's picture. They are so far removed from what we consider *natural*, that is, from the actual, that the least approach to a flippant or a humorous mood turns their beauty into absurdity. It is not strange that a flippant and humor-loving American public, and a prosaic, if usually well-meaning press, should have failed to see the delicate grace and quaint poetic feeling of Mr. Dewing's work. The rather large canvas represented two women in mediæval dress seated under a well-canopy backed by stiff foliage, in the middle of a level landscape, and blowing on long horns. In front of them were two slender hounds, and the long lines which thus formed the basis of the composition were repeated by the cloud-forms and by distant flights of birds. A dangerous conception, truly, to tackle unsuccessfully, and easily puerile did the execution prove weak or inappropriate or did the artist show signs of anything but the most entire seriousness of mood. But all these dangers were, I think, avoided. The scale of color was kept low, and an almost tempera-like effect produced with the paint, at least here where the picture hung rather high up on the wall. The formal arrangement and the shunning of any attempt to render textures emphasized most artistically the essentially unreal, poetic aim the artist had had in view, and the harmonious color and formal grace of line showed, I think, a peculiar and original talent. If I have spoken more in detail of this picture than of any other in the place, it has been because it seemed to me, not absolutely but relatively, the most important canvas on the walls, as showing the dawn among us of those qualities which have been most palpably lacking in our art. If the development of poetical feeling is to be encouraged by us along with technical accomplishment, we must cease from such flippant moods as those in which Mr. Dewing's Morning was gazed at by the public.

These are not many pictures to have picked out for approval from a total of seven hundred and fifty numbers; yet I think that if we include Mr. Lippincott's and Mr. Ernest Longfellow's work, little of excellence has escaped notice. The drawings were unusually poor, and the sculpture, with one or two exceptions, was, to say the least of it, remarkably dull.

It will not be out of place here to speak of Mr. Bridgman's pictures which have been lately on exhibition at Mr. Avery's gallery. They include all three of the large works which made his reputation at three successive Paris *Salons*. Infinitely superior in every way to the small canvases Mr. Bridgman has been sending home of late, they yet rather seem the work of a scholarly, well-trained hand than of one inspired by much individual talent, or guided by an eye sensitive to artistic effects, or to charms of line and color in themselves considered. From a favorite pupil of M. Gérome's one does not look for witchery of color or any very sublime or subtle sentiment. But the master shows in his composition most often that he has seen the subject portrayed from a pictorial point of view. This is by no means so apparent in the works of the scholar. Mr. Bridgman's pictures are nothing if not "anecdotal." The Burial of a Mummy is the best in point of color, and decidedly so in point of composition. It is the earliest of the three, and Mr. Bridgman does not seem likely to advance beyond it. There is much elaborate archæology in the Procession of the Sacred Bull, and still more in the Pastime of an Assyrian King — though where the artist got his authority for many things in the latter work one is at a loss to discover — but pictorially they do not stand very high. The technique is careful, and lacks, perhaps, a little of the hardness characteristic of Gérome's brush; but it also, unfortunately, lacks something of his sureness, is not applied to drawing so accurate, and renders no textures with the perfection Gérome attains in some; and the pupil fails utterly in what to me has always seemed the master's supreme accomplishment — the reproduction of oriental expressions as well as features. There was not one countenance in the Sacred Bull which might not have been that of a European masquerading in "Aida." Mr. Bridgman, with all his cleverness and all his acquirements, cannot be called a great or even an original artist. There is nothing in his work, either in its technique, its spirit, or the point of view from which it proceeds, that was not familiar to the world long before this man spoke, and we feel that just such pictures, to a hair, may easily be painted when Mr. Bridgman no longer wields a brush. I need hardly add that he will scarcely be enumerated in the future among those who are now, we hope, laying the foundations of a distinctively American school.

At Mr. Moore's American Art Gallery one may still see Mr. Moran's superb Turner, which, as I understand, its owner is etching for publication. One is almost tempted to wish this picture had not been so conclusively proved a Turner. We might then, on its sole testimony, add another to the list of men whose work we reverence. At the same gallery among the other works, all of which are American and for sale, is the best McEntee I have ever seen, and the best Carleton Wiggins as well.

At Goupil's just now the great attraction is a beautiful large Corot, An Antique Dance in a Sunset Landscape. The scene is so still and solemn and the effects of light and air so exquisite that one alalmost resents the prominence of the figures, which fail a little of perfect grace. A fine large Heilbuth — a cardinal talking with school-boys on the Pincian Hill — is also to be noted.

The sale of Mr. Abner Harper's collection has been the most important event of the season to picture-buyers. There were few poor pictures in the one hundred and fifty sold, which embraced, among others, good examples of Diaz,—in landscape only,—Dupré, Th. Rousseau, Daubigny, Corot, Kaemmerer, Michetti, Pascutti, Clays, Jacque, Van Marcke, and the fashionable painters of lower grade,—Aubert, Frère, Jaquet, Knaus, Meyer Von Bremen, Schreyer, Vibert, — who vary in excellence so greatly among themselves, but are alike high in the favor of our fashionable public. There were some good Boughtons, and calling for especial mention were an exquisite flower-piece by Mettling, a superb landscape by Munkacsy, and three pictures by Boldini. The most fascinating of these last was The Cigarette, a tiny bit only four by five inches, yet containing a full-length figure and a number of accessories, all painted with as free and clever a brush and as much resultant life and reality as though the scale had been measured by feet instead of inches. Many of Mr. Harper's pictures were well known from various loan-collections, and the prices obtained for them were high.

At Mr. Avery's recent sale some good pictures came to the hammer with many mediocre ones. The Monticellis, the Calame, and the fine Josef Brandt, which have been the gems of his gallery of late, were none of them, I think, on the catalogue of sale.

Mr. Dolph, the artist, has recently sold all his pictures, whether painted by himself or purchased, together with a large collection of bric-à-brac and studio properties. Some rare specimens of ceramic ware and embroideries went at a very low figure.

The recent disaster at the Madison Square Gardens will, it is to be feared, put an end to the loaning of pictures or of works of art of any kind, for the benefit and entertainment of the public. The worst that lenders have long been predicting has come to pass. Many fine pictures and *objets de vertu* of all kinds perished entirely, or were irretrievably injured. Even their money equivalent, which at the best would be but poor consolation to the owners, is not forthcoming, as the collection was insured against fire only.

M. G. van Rensselaer.

THE ILLUSTRATIONS.

FRONT OF STORE AND APARTMENTS, PEARL STREET, ALBANY, N. Y. MESSRS. POTTER & ROBERTSON, ARCHITECTS, NEW YORK, N. Y.

This building has lately been completed for the Hon. Robert H. Pruyn, of Albany, N. Y. The floors above the store are used as apartments in connection with the Kenmore Hotel, which adjoins on the right. The front of this building — which is all that was under the care of Messrs. Potter & Robertson — is laid up with pressed and moulded brick, relieved with Belleville (brown) stone, the ornamental panels, etc., being carved in these materials. The roof is covered with vitrified red tile, and the store front is constructed of iron, as shown on the elevation.

DESIGN FOR A COUNTRY HOUSE. MR. A. E. BARLOW, ARCHITECT, NEW YORK, N. Y.

COUNTRY-HOUSE, DESIGNED BY MR. C. W. ROMEYN, ARCHITECT, NEW YORK, N. Y.

DESIGN FOR A VESTIBULE, BY MR. CICERO HINE, OTTAWA, CAN.

HOTEL AT BURNSIDE, KY. MR. CHARLES CRAPSEY, ARCHITECT, CINCINNATI, O.

This hotel is now being built by a Cincinnati company, on the Cincinnati Southern Railway, one hundred and fifty-seven miles from Cincinnati. The building will be of wood, and will cost about $15,000.

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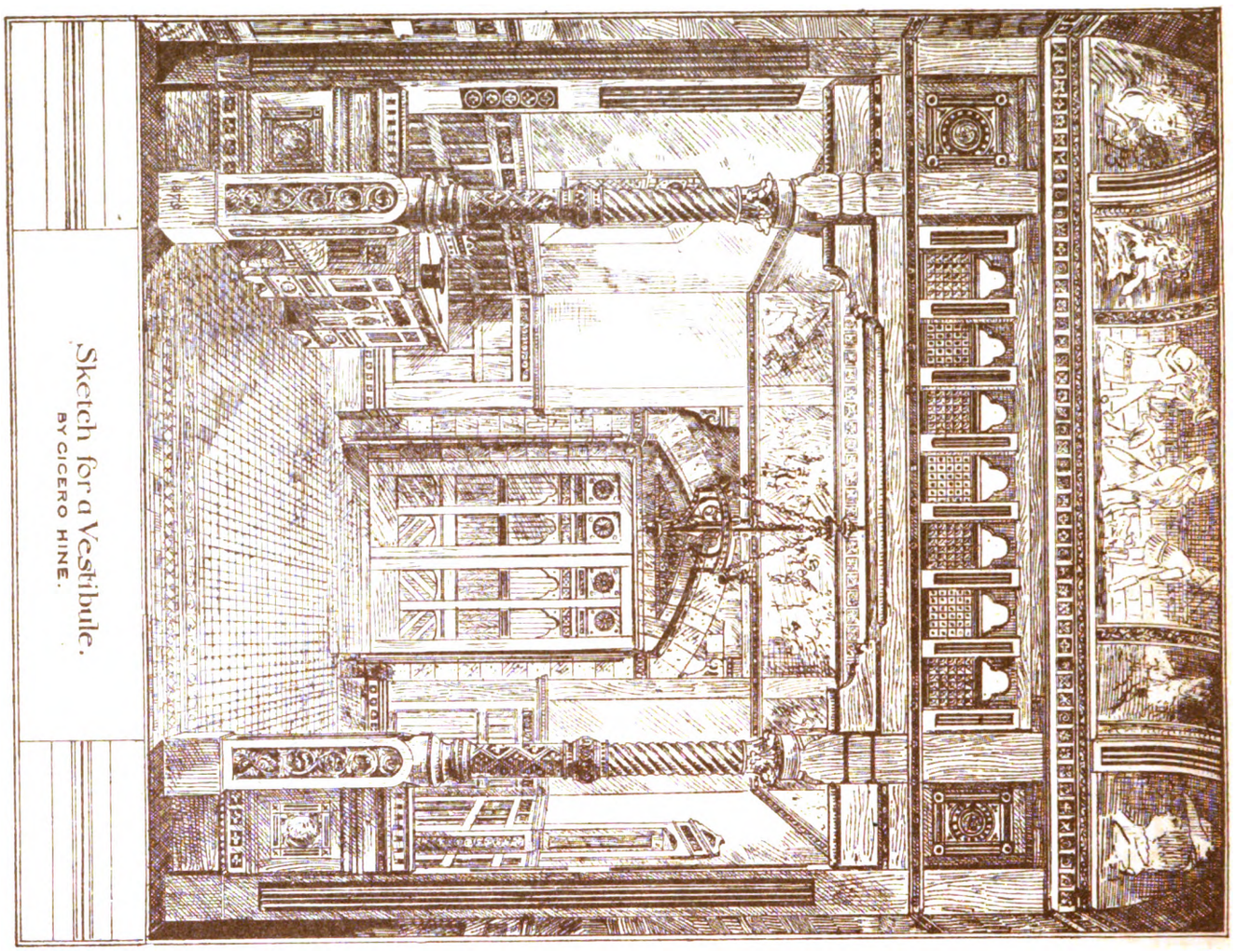
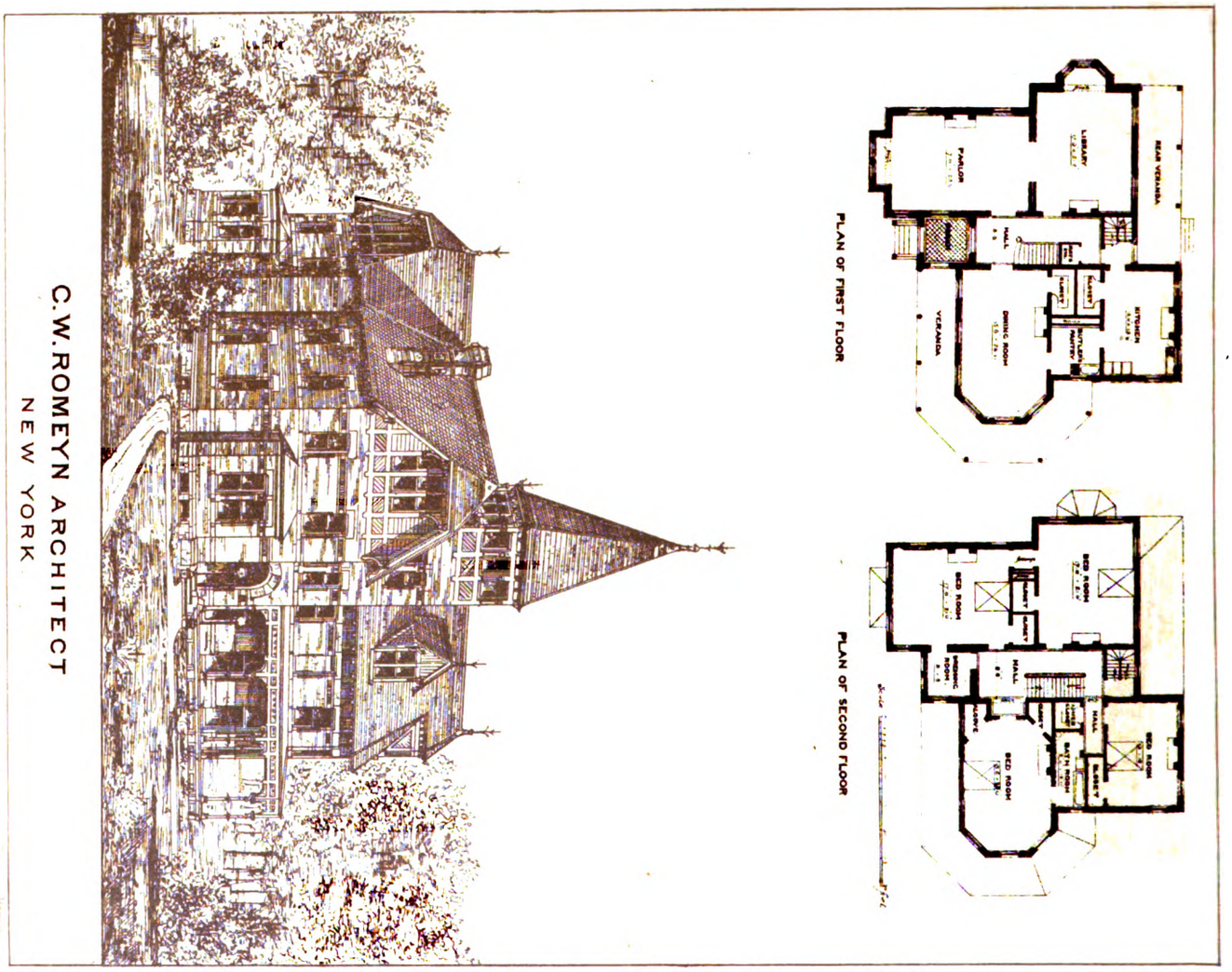


Sketch for a Vestibule.
BY CICERO HINE.



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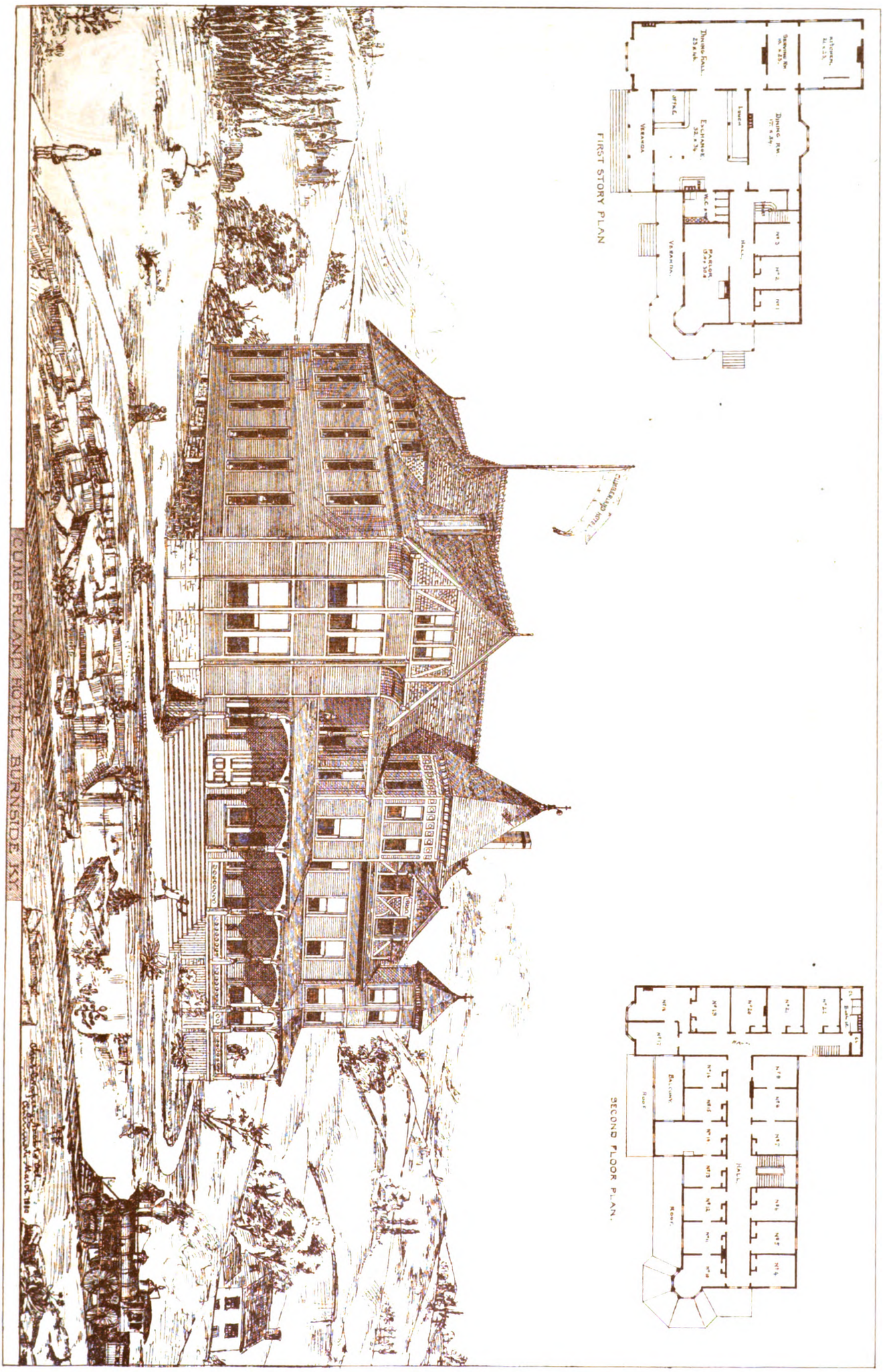

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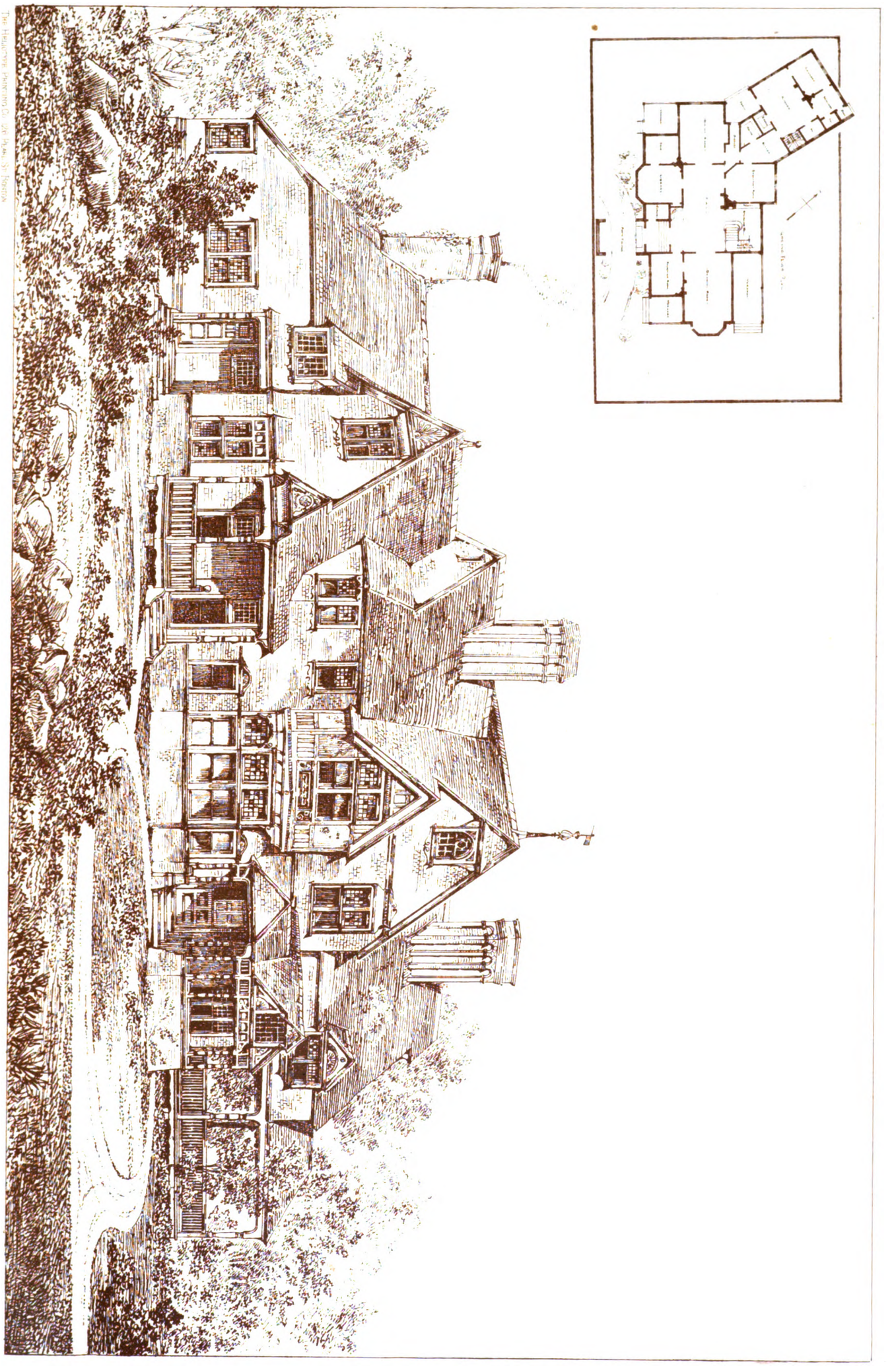

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MICHAEL MUNKACSY.

THE feudal castle of a Magyar is the idea which suggests itself to the imagination as one crosses the threshold of M. Munkacsy's residence. The exterior is of red brick, faced with Caen-stone. The windows are narrow, and defended by iron-work. Lanterns of considerable dimensions, suspended from iron supports, hang at each side of the gateway, of which the very handle of embossed steel is mediæval. You enter beneath an arched passage leading to a courtyard. The former is painted in pale red, with intersecting lines of color. On the right is the entrance hall, a marvel of effective decoration. The winding staircase opposite is of black Spanish oak. The beams and balustrade, somewhat roughly finished, have a magnificent effect against the walls hung with scarlet cloth, and adorned with armor and pictures. The staircase itself is reflected in a huge mirror in the entrance hall, against which is a fine old carved oak bench. A *portière*, of the tint of burnished gold, embroidered with a design in olive velvet, harmonizes the tone of color, which is further subdued by the softened light of the lattice windows, set in a narrow rim of amber glass. A noble palm-tree in a *faïence* jar fills up the space on the left at the foot of the stairs. To reach the *atelier* you ascend to the second and uppermost floor, your attention much bewildered by rare and beautiful objects on the walls, such as etchings set in frames of ebony, a picture by an old master, a bronze reproduction of an antique, etc. A gallery of oak runs round two sides of the landing. Curtains of olive velvet separate the gallery from an anteroom hung with tapestry, and full of artistic beauty.

The *atelier* is one of the most sumptuous in Paris. A curtain of brown velvet crossed by one of olive, and surmounted by an embroidered hanging of gold on crimson, serves for door. The ceiling is of the Henri II. period, in bosses of carved oak on blue and gold — the cross beams which form the compartments of oak and gold. The walls are tapestried. In a recess on the left is a chimney, which recalls that of the Council Chamber at Bruges. The chimney-piece itself is a rare specimen of wood-carving. The upper part is in seven compartments, in each of which is a standing figure of a knight or lady. On each side of the vast fireplace are figures of knights seated. One fresh from the Crusades relates to his host his tales of flood and field. His attitude is full of life and spirit. The figures are in oak. An oak wainscot, some seven feet in height, carved in the style of the chimney, supports a shelf, on which, in the corner to the right, are candelabra of old majolica, a Venetian mirror on a cabinet, and a longer mirror, set in a deep Florentine frame, cutting off the angle. The corner to the left is filled by a majolica jar some four feet high. On a table in the centre stands a splendid bust in bronze of the artist, by Baryas.

Against the wall of the *atelier* itself, and opposite the huge window, there is a gallery of old oak resting on pillars of oak, which forms a passage of communication from one room in the upper story to another. The corner of the *atelier* on a line with the entrance door is cut off, a tapestry *après* Bamker filling the space above, and a Dantzic Schronk the lower. The fourth corner disappears behind a curtain, which projects so as to make a door. On this curtain hangs a banner emblazoned with the royal arms of Hungary. To describe the exquisite arrangement of embroidered velvets, brocaded satins on canopies, *fauteuils*, etc., would require the pen of the *redacteur* of the San Donato collection.

There is a strange analogy between the character of his works and his own physiognomy: his powerful figure and energetic countenance have the stamp of a rich artistic temperament. The forehead is broad and arched, and the deep furrows between the brows indicate a profound thinker. The steel-gray eye, with its grave, frank, and dreamy expression, betrays the sensitive nature of an artist. His whole being conveys the impression of a man in whom iron strength of will and genius are united, and these were required to struggle victoriously against the disadvantages of his early years. His story reads like a romance, and to one who has just quitted his princely residence its vicissitudes seem scarcely credible.

The mother of M. Munkacsy died when he was an infant. His father took part in the Hungarian insurrection of 1848, was taken prisoner, and died when the child was but four years old. An aunt took the little orphan to her home, but one night robbers broke into her house and murdered her. A lawyer uncle, ruined by the Revolution, next took charge of the little fellow. Too poor to educate him, he apprenticed him to a joiner. At the end of four years the boy worked on his own account. Some students of the college of Arad taught him to read and write. He then instantly commenced the study of literature and history. Schiller specially fascinated his fervid imagination. He attempted to express his thoughts in poetry, but was dissatisfied by the result. For three years young Munkacsy worked from five in the morning to late at night at the rate of five shillings a week. Hard work, mental excitement, and insufficient food brought on fever. His lawyer uncle had meanwhile prospered, and sent for the lad to his home at Gyula. There he met the portrait-painter, Samosy, and for the first time in his life saw an artist at work. He was just eighteen, when it suddenly dawned on him that he was born to be an artist. Samosy showed him much kindness, gave him some instruction, and took him to Arad, where he was engaged to paint several portraits. There Munkacsy gave lessons in drawing in exchange for his dinner. His first portrait was remunerated by a winter coat. Under Samosy's guidance he made rapid progress, and worked for three months on a picture, which excited so much admiration that he determined to exhibit it at Pesth. The Art Union bought it for eighty florins. The subject was The Invitation to a Wedding. Two young Hungarian peasants, in holiday attire, decorated with ribbons, invite the inmates of a cottage to a wedding. One of the two delivers the message, whilst his companion makes love to the young girl of the family, whom he seems willing to invite to his own wedding. Munkacsy's second picture fetched 130 florins. With this sum for capital, he started for Vienna, where he studied in the galleries, and returned to Pesth in 1866. Disease of the eyes compelled him to spend six months in a hospital. He left it cured, with but twenty florins in his pocket. With indomitable energy he, however, started for Munich, where he studied two years, and thence to Dusseldorf, where he painted The Last Hours of a Man under Sentence of Death. Knaus discouraged him from undertaking so important a subject. Undismayed, young Munkacsy quietly went on with his painting, which he exhibited at the *Salon* in Paris in 1870, where it created a sensation and carried off a medal. — *The Architect.*

UNRESTRICTED COMPETITION.

"THE beneficent force of competition never ceases," is a maxim held by one school of political economists. Another school asks the question: "If a series of failures disprove a principle, what must be said of the failures of competition, where twenty men fail for one who succeeds?" George Jacob Holyoake, a leader in this school, says: "Had any one invented competition, it would have been hooted out of the world long ago, as an infernal contrivance of spite and greed," and uses the picturesque phrase of a member of the House of Commons, that "competition is an ugly rush;" "an ugly rush," adds Mr. Holyoake, "after bones which everybody is equally ambitious to pick."

Those who are actively engaged in this ugly rush frequently question the truth of the maxim of the first school mentioned, but are often deterred from an expression of the doubt of the "beneficent force of competition," through a fear of being set down as superficial thinkers. Nevertheless, it is my purpose to examine briefly the practical working of the unrestricted competition that has been growing year by year into practice in the business of building, with a view to prove that its tendency is to deteriorate the character both of men and workmanship.

A community suffers by any degradation of the standard of morality, and the narrow use of the word "moral" can no longer be indulged. It fills the warp and woof of all human affairs. George Eliot gives this idea its finest expression when she says: "Thoroughness of workmanship, care in the execution of every task undertaken, as if it were the acceptance of a trust which it would be a breach of faith not to discharge well, is a form of duty so momentous that if it were to die out from the feeling and practice of a people, all reform of institutions would be helpless to create national prosperity and national happiness. But this duty of doing one's work well, and taking care that every product of one's labor shall be genuinely what it pretends to be, is not only left out of morals in popular speech, it is very little insisted on by public teachers, at least in the only effective way, — by tracing the continuous effects of ill-done work."

In order to deduce the prevalence of "ill-done work," of which such loud complaint is at present made in the building occupations, from the practice of unrestricted competition, it will be necessary to illustrate the points I desire to make by examples taken from the methods of competitive building in vogue in the West, as contrasted with the methods of past years.

At the head of the building profession stand the architects, now become a numerous class. Until within the past ten or fifteen years, this class had scarcely felt the effects of severe competition. Now, owing to the rapid increase in their numbers, few professions suffer more from this cause. Perhaps no profession has encouraged and lent its aid to promote and stimulate unrestricted competition in the same degree as has the architectural profession. Architects who have uniformly discouraged and discountenanced competition among themselves have, with very few exceptions, as uniformly encouraged and countenanced it in all other branches of the building business, until, like a boomerang, it has come back to torment them. They cannot escape the effects of customs which they foster in a business where they are the most prominent actors. Hence we find the public soliciting the profession, by advertisement and otherwise, to enter into competitions of the most degrading character. The columns of the *American Architect* rarely contain samples of such solicitations, but other instances might be given which would make the most ungenerous samples appear estimable by contrast.

The effects of this competition among architects have so frequently been enlarged upon in the pages of this journal, that I need not dwell upon them further than to ask one question. If competition among architects (unrestricted competition) is considered so derogatory to the character of the men and the profession, how can it exert beneficent influence on the character of builders and contractors, and upon their branch of the business, or indeed upon any one in any manner concerned in it?

Leaving out of our consideration then, for the present, the architectural competition, let us examine the prevailing methods among builders, and see if we can discover any features in them that deserve to be perpetuated for their "beneficent force."

The architect has plans and specifications prepared, more or less complete, and invites proposals for furnishing labor and materials for

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the whole or parts of the building. On the day appointed the proposals are opened, and the contract awarded to the lowest bidder. Now, what will, in the nature of things, be the chief consideration of the contractor who has secured the contract? Of a certainty, it will be where and how he can save in the labor and material, and not how well he can perform the contract. First, he will seek to purchase material as low as possible, perhaps with little or no regard of the requirements of the specifications. Will it pass the inspection of the architect and be accepted? is the mental query, and the same consideration influences the performance of the labor. How little labor will suffice for a given piece of work, to insure its acceptance by the architect? These questions arise in the thought of the contractor, irresistibly, after obtaining a contract in the usual manner. How can he do otherwise? In the "ugly rush" to secure the job, he has estimated it with an eye to the probabilities of degrading the standard of excellence in material and workmanship by scamping it, and evading the requirements of the specifications. He understands that upon the acceptance of the work and material by the architect, he escapes the blame ostensibly. He also understands that upon the architect's knowledge of work and material depend his chances of success in scamping; and he as well understands, if he be an experienced mechanic, that many architects have not sufficient knowledge of particulars to pass intelligent judgment, and that inferior work and material are often accepted with as much satisfaction as the superior, and that architects will quibble concerning trifles, and wholly overlook important matters, from a lack both of theoretical and practical knowledge. A kind of cuckoo song repeats itself in the specifications for all classes of buildings, with regard to material and manner of doing the work, to which little or no attention is paid by the contractor. I will give one item as an illustration: —

"The stones in the foundation walls are to be laid on their natural bed and well bonded." Now, the largest portion of the stones in foundation walls in this city are laid on their edge, because the walls can be built up faster in this manner, and very seldom are they well bonded. The work is accepted, however, as readily as if the specifications were complied with in the strictest manner. In some instances there is a blissful ignorance as to what is the "natural bed" of the stone.

It is as great a violation of business principle, when a specification is drawn up in loose phraseology, that will not be considered as positive in the demand of material and the manner of using it, as it is for the contractor to evade the requirements of such specifications in any way he sees an opportunity for doing.

A specification should be positively explicit, and the contractor held to a performance of the work in accordance with it. Again, all necessary detail drawings should be made, that would fully show the proposed methods of construction, forms of mouldings, etc., — before contractors are called upon to estimate and make proposals. This is seldom done, except in case of public work, and the contractor has generally to estimate from a quarter-scale drawing and the specifications. This is in point of fact simply guessing.

These incomplete and unjustifiable methods of planning and performing the work of building are well understood, but there is no effort made to effect any reform. They stamp the business in all its branches with a demoralized aspect which presents itself forcibly to the public mind, but the secret of the demoralization is discovered only by the few, while the many suffer, directly and indirectly, from the immorality of ill-done work.

We will now, by way of further tracing the effects of such work, suppose that a contract has been as faithfully fulfilled as it can be, possibly, under prevailing conditions. Architect and client are both well satisfied. The client desires further improvements to complete his establishment, — a case which frequently happens. Suppose that the first contract has been for a dwelling, and that a stable is desired. This involves at the present time another competitive strife. No matter how satisfactorily the first contract has been performed, the contractor, if he cares for the job, must enter into competition with a number of others for the building of the stable. What has he gained by the faithful execution in every detail of his first contract? I have supposed that architect and client were both satisfied with his work on the first contract. He must be content to be satisfied with himself, with his conscientious and creditable work. He has no other source of satisfaction, and he very soon learns that this sort of satisfaction doesn't pay. In fact, by the very performance of his contract in a strictly honorable manner, by his thoroughness, and the "execution of his task as if it were the acceptance of a trust that it would be a breach of faith not to perform well," he may be out of pocket. He is behind in the race that has been governed by unrestricted competition. His self-complacency over a good job, accurate work, and faithful completion of details, will not pay his bills, and the soreness cannot be entirely healed by the plaster of his own satisfaction with his work. He begins to ask himself if it is not a truism which all business men admit, "that it is a disadvantage to any commercial undertaking to say that it is honest," and if the man who asks — as all practical business men do ask — not "is the thing moral?" but "does it pay?" is not, after all, in the right. Is it much wonder that he sets himself to the study of how to scamp a job, instead of how best to secure its thorough performance? Any man who can pass through a series of similar experiments and not become demoralized is a man of superior moral stamina, — a very Caleb Garth among men, the typical workman, with whose portraiture George Eliot has garnished industrial literature.

There was a time in the history of the building business, and that within the recollection of the youngest now engaged in it, when a contractor would treat with scorn the proffer of an opportunity to make a proposal for building a stable when another had immediately before built the house, as in the foregoing supposable case. It would be difficult to find a contractor to-day who is not willing to do this, or even who will not seek the opportunity. This change has been brought about by the practice of the architects who solicit proposals under these circumstances. It is hard to find an architect who has back-bone enough to tell his client that such a course is at least discourteous, if not dishonorable. Architects do not seem to believe this to be the fact themselves, so readily do they lend themselves to the cupidity of their clients, often recommending to them this course. It is pertinent here to inquire where would be the dishonor or lack of professional etiquette, if a second architect should step in at this stage of the work, and offer to furnish the necessary drawings and specifications for the completion of the establishment at one or one-and-a-half per cent less on the cost of the work, than the first architect charged for what he had done. The law of unrestricted competition applauds the one course; why not the other? Honor, etiquette, good-will, and such sentiments go to the dogs under this law, and men go with them. There cannot be one criterion of ethics for architects and another for builders and contractors. A higher standard is demanded for both.

A premium is offered in cases like this for bad work, which cheap work really means. One of the oldest builders in this city, who is now engaged in the manufacturing business, lately said to me: "Were I now in the building business, I should try to establish a reputation as a cheap builder. There's money in it!" He is right. The cheap builder very frequently gets the best prices going, on his reputation for that particular; while the man who does his work invariably well is avoided as an expensive man. It is very difficult to impress upon the minds of people that if good work does cost more than poor work, it is the cheapest in the end. Here again the architect panders to the public, and often solicits proposals from the cheap and inferior workman, excepting only for such first-class buildings as he fears to intrust to him. He does not strive to impress upon his client the fact that inexpensive buildings are really cheaper when well built than if built in a careless and imperfect manner. His reasons for this are evident; it is simply competitive strife again among architects, and this of a very vicious nature. An architect, for instance, takes measures to make it known that he can let a contract to get a house of a given size built for a certain sum, and, to confirm his statements, he points to similar houses that have been built for that sum of money under his direction. The consequence is that each architect now endeavors to compete with this one by cutting and cheapening plans and specifications, and obtaining proposals from mechanics known to perform their work in an inferior manner and therefore *cheaply*. There naturally follows a general deterioration of work and a general demoralization of all concerned.

In the strife of unrestricted competition, every man and every interest must care for itself, or perish in the struggle. Men lose the courage to be honest. Honesty is outwitted in the contest. "Unmitigated competition is at best," says Mr. Holyoake, "organized war." If men and morals are worthy of consideration, then we should seek to supplant the barbarism of war by the equity-loving rule of peace, and to mitigate the evils that have accrued to the entire profession of building, from the architect to the journeyman, in this ceaseless strife.

Much has been written in the columns of the *American Architect* upon the deterioration of work and workmen in the building trades. The fact must be admitted, lamentable as it is. Various causes have contributed to this end, and are indicated in this article together with those which produce the more general results of unrestricted competition. This last phase of the present investigation, however, demands special attention, which shall be given to it at some future time. It is quite the fashion among journalists to attribute this deterioration to combinations amongst working-men. I do not believe this to be the true cause. It would be equally unjust to attribute the unprofessional conduct of any architect to the American Institute of Architects. Combinations are one form of protest against unrestricted competition.

The evils of unrestricted competition must of necessity become apparent; we must each suffer in our special vocations, and the public must suffer severely, before any stringent measures will be applied to arrest these demoralizing tendencies.

We have each an individual responsibility in the matter. It rests with those who suffer in any degree from the deterioration of men or of methods in the building occupations to urge all measures which shall institute the needed reform. B.

HINTS ON LANDSCAPE-GARDENING.

The purchaser of an estate has frequently to make it, or more frequently still, to undo what has already been done. The aim of the present remarks is to suggest rather than to lay down any precise rules; to hint at what should be attained and what avoided.

The approach to a place is of the first importance. If there is no convenient and decent road already made, its formation should be the first object. Convenience should always be regarded before appearance, and therefore, if there be no insuperable difficulty in the way, the road or entrance to a place should be made with reference to some desirable point or junction with a public road, or proximity to a town,

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railway station, or some eligible neighborhood. To be isolated from the world by the want of some easy communication, is a misfortune which many retiring people make when they choose a country or rural neighborhood. No mere promise of such a convenience as a road being formed should induce any one to build on land, however attractive in other respects it may be: many have been led into such a trap.

The purchaser of a place should further consider what extent of carriage-drive is necessary to be made, as any great length, in some districts, would be an infliction of continual road repairing, a process not always inexpensive. Steep ascents are tiring, though a gradual rise to the house is better than a decline. In small places, a carriage-drive is often better avoided, as it detracts from the size of grounds, and cuts up the garden or lawn. A long serpentine drive through a limited area of ground gives an air of pretentiousness that is distasteful, while a wider gravel road than is really necessary entails unnecessary labor to keep in repair. The breadth of a road should be in inverse ratio to the breadth of the grass at the sides. Room for two carriages to pass is requisite in much-frequented roads. Roads passing opposite or near principal windows should be avoided, nor should they be allowed to intersect the breadth of turf or garden in front of windows.

Some people have a great fancy for straight lines and roads. In small places, as in the suburbs of towns, a circuitous approach is often ridiculous. Quite as distasteful is a straight road or path through a park, unless, indeed, it be a central avenue approach, as was common when the Le Nôtre fashion prevailed. It should be remembered, interest can only be preserved by continual changes, and in Nature especially we find a constant variation in contour and line. In laying out an approach, then, it is desirable that we so vary its line and direction, that at each step or turn of it some new scenery opens upon the view.

No less important than the main approach to a house is a back access, and a provision for this must be made without its intrusion within the pleasure-grounds. Sometimes a branch off from the main entrance before it is noticed from the house is necessary, unless any back way or lane can serve. In small places one entrance is often desirable, and by the aid of plantations a branch walk or road may readily be got for the accommodation of tradesmen and the removal and supply of necessaries.

The position of the house in reference to level has already been indicated. Prospect must not always be looked for, nor can desirable aspect be secured; other difficulties also frequently arise, such as nearness to unpleasant neighborhoods, buildings, public roads, etc. The art of the landscape-gardener can, however, do much to atone for such deficiencies. By removing ridges of ground, hedge-rows, plantations, and diverting roads and fences, a very confined and cramped situation may often assume an extent its proprietor or occupier little contemplated. In a similar manner objectionable views, bad aspects, and exposures to wind, rain, etc., can often be shut out or remedied without much expense by the intervention of mounds, clumps of trees, or by excavating slight hollows and other like expedients.

The existing levels or surface of ground may often be left much as they are, the removal of a ridge or the formation of a slight bank frequently effecting all that is required. In suburban places an objectionable public road or footpath, or the boundaries of land, can always be concealed by forming a hollow and throwing the earth against a wall, or making a bank. In hilly and undulating districts the best position for a house is on the slope of a hill commanding a valley and another rise; the slope should fall towards a good aspect if possible. Undulating ground is always to be preferred to flat, dead levels which are more difficult to drain and keep dry. In flat surfaces slightly hollow portions may serve for ornamental sheets of water, or for surface drainage, the excavated earth being placed on the higher parts to form a rounded contour. Such variations should be cautiously made, and never overdone, or an appearance of artifice will result, and the general character of the surface of country lost. Undulations ought never to appear abrupt or of regular outline; but the contour lines should agreeably blend or fall into one another without the slightest angularity or harshness being apparent. The bottom of depressions should never be gauged, as it were, by planting; they are best left with a grassy surface, the planting being reserved for the sides and swelling of surface. Variety and contrast not too great nor sudden is what the eye requires in forming groundwork. In small, contracted places a raised bank to conceal the fences, and thereby the limits of the ground, affords an opportunity for the ready disposal of the surplus earth which may be advantageously removed round the house, effecting at the same time a raised platform for the house, the means of draining the surface, and the appearance of extent.

Although these improvements can be made after the house has been built, it is recommended that the rough groundwork and levels should be formed before the operations of building are commenced, as surplus soil is more readily obtained, and the levels adjusted when the excavations for the basement and foundations of the buildings are being performed. At least, such rough groundwork might be done at this time as forming banks or cutting out the approaches, which may be filled in with the rough stone or old dry material, the finishing and sodding of surface and parts near the house being left. It is desirable also that the operations of draining and trenching, and planting the larger trees and shrubs, should be commenced, thereby affording them time to take root and develop the appearance of the place. In bare, exposed places, when planting is left till the house is finished, a bald and miserable appearance results, which often tends to disgust occupiers or purchasers, besides the inconvenience of such operations being performed after the house is tenanted.

Drainage should be the primary operation in a new place, or continual vexation will be experienced. A damp, sodden soil, always saturated with water, cannot be permeated by even the solar influences, the air cannot penetrate it, and it remains cold and ungenial. Air, warmth, and drainage of stagnant water and gases are as essential to health and growth of plants as to human beings. The extent and nature of the drainage will depend chiefly on the nature of the soil and the kind of surface. A retentive subsoil requires deep drainage, and in flat situations large tiles or pipes. A porous, gravelly, or sandy subsoil, and an undulating surface, requires little or no land drainage, although there are exceptions to this rule. Land drainage tiles are generally used for draining, and where placed not too near plants or trees are effectual. Rubble drains, or trenches cut to fall of ground, and filled with coarse gravel or stones, have been found very useful, and such drainage is inexpensive. Care must be taken to cover the upper part of these drains with grass-sods or straw, to prevent the interstitial spaces becoming choked. In steep declivitous ground, as on the side of a hill, it is a good plan to lay a network of such drains or parallel lines of them under the house, such lines of drains being intersected by large cross-drains, running on each side of the building and carrying off all soakages, etc. Surface drainage is best effected by regulating the levels and inclinations of the grounds and paths; the water being carried away into the nearest outlet, or dry rubble pits may be provided, or such surplus water may be carried into any ornamental lake.

Walks. — These should not be left to any ordinary workman or gardener, as is generally done, with the idea that it is a matter of little importance what curvature or direction a path should take so long as it answers its end. The most agreeable and pleasing lines or curves are those which seem to naturally take the most direct route, winding their way between objects and groups of trees as if their course were naturally turned by them, not as though every turn had no object but its own deviation. Their width should depend on their use, their length, and the extent of ground. Straight paths should be wider than curved, which may vary from four to seven feet in ordinary gardens. Paths should partake of the level of the ground, following its contour, though sometimes the edges may be rounded up to the grass levels or lawn. Sometimes a winding path may be best concealed from the gaze of the windows, or its object may be for privacy; in this case a depressed level is best. Generally walks should not be made too wide, as the extent of gravelled surface lessens considerably the apparent size of the grounds. A grassy surface is always more refreshing than one intersected or cut up by paths. The prim gardens and lawns seen in front of many suburban villas and cottages are particularly distasteful and paltry owing to the numerous ramifications of paths and the formality of flower-beds, planting, etc., attempted, as if the object the gardener or tenant had in view was to make the most of the limited slice of land. The most convenient seasons for groundwork are the summer and autumn, as the soil is more easily moved and worked than in damper seasons. If the soil be heavy it should be deeply trenched, especially in those portions to be planted. Lawns require a lighter and poorer soil than that for plantations, which should have the upper or richest earth, which may easily be obtained in the formation of paths, etc. The application of manures, lime, soot, ashes, leaves, or other refuse, whether solid or liquid, to the soil is required on stiff, poor, and "hungry" ground. Moule's earth-closet system, or the irrigation of the land with liquid manure, can easily be adopted in the country and with little or no expense.

Plantations. — If surface and levels do much to alter a place, plantations do more. Improvers and purchasers of property, as a rule, regard this feature with a comparative indifference. The real value of a well-wooded or planted place is never sufficiently regarded, for it should be considered that it is easy to cut down and reduce to bareness, but not so to create the shelter and beauty of a well-wooded locality. The growth of a century is needed to clothe a naked site. Shelter should be the first object in planting a new place. It must be judiciously done, not by stiff lines or belts, but by groups interposed without measured precision. Unpleasant quarters and aspects may be thus effectively shut off, and such masses of trees answer in flat countries the purpose and shelter of hills. As a screen to hide objectionable neighborhoods, cottages, and tenements, they are invaluable. Concealment of boundaries is another use in planting, though this must not be carried to the excess of confining and closing in a place by a close hedge of trees, as is sometimes noticed.

Where old trees and plantations exist great care should be taken in thinning them. In this the landscape-gardener shows his knowledge of pleasing combinations, light and shade, and natural landscape effect. Beauty of outline in foliage and pleasing groupings should never be touched, as when two or three trees form a head, become intermixed and their stems interwoven, but by removing others near them their combined beauty will be enhanced. Sometimes aged thorns, maples, and ash, and other specimens, may be left for similar reasons. As a rule thinning should not be done too evenly, leaving single trees, especially such as have grown together. New additions to old plantations should not be planted separately, or a want of connection will be apparent, an intermixture of old and young being necessary. Sometimes thickets are useful to conceal unsightly buildings and objects, while they form an agreeable variation to more open planting, and may be thinned occasionally.

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Evergreens, as a rule, are more desirable in a limited place than deciduous shrubs, though an intermixture of the two kinds is both desirable and more effective, the latter by their brighter spring foliage forming a happy contrast to the duller greens. In old methods of planting, the dwarf plants are placed along the edges of beds, the larger and higher growths being kept in the centre; but this is contrary to natural variety. Irregularity, though not a studied diversity, should characterize both the groups and the outlines of the shrubs and plants, round-headed being blended occasionally with trees of an upright or spiry character.

In planting lawns, single specimens may be introduced, omitting groups and assisting their folial outlines, but never dotted about evenly, destroying the breadth of grass, as often seen. These specimens and groups should unite and soften the outlying groups and trees with the more finished accessories and gardenesque character of the house and its precincts. Neither should single plants intercept the views from the principal windows; they should rather sustain them. A house should never be buried by shrubs and trees, but masses of them may be placed to hide particular offices and diminish outwards in figure and density, so as to allow good ranges of view from the principal rooms.

In large places, the more formal style of planting may be adopted; terraces and avenues of shrubs and flowers, and other architectural accessories being employed, to give importance and effect to the building. Geometrical laying-out entails labor and expense, and is not adapted for ordinary villa residences. For gardens and lawns the plants best suited are rhododendrons, azaleas, laurels, juniper, cypress, arbor-vitæ, cedars of Lebanon and Deodar, with roses, and other flowering plants. Holly, yew, berberry, Norway maple, and other shrubs, are also good as undergrowth plants, and for filling in between others. In the northern United States may be added the Missouri currant, weigelia, cornel, laurel, lilac, viburnum, California privet, Forsythia, spiræa, Tartarean honeysuckle, dogwood, deutzia, magnolia, catalpa, and pyrus japonica.

The ornamental specimens should always be protected by evergreen trees and shrubs, which should be first planted thickly; and for the value of shelter the indigenous trees of a place or a wood should be sparingly thinned. — *The Building News.*

PUBLICATIONS RECEIVED.

Dwelling Houses: Their Sanitary Construction and Arrangements. By Professor W. H. Corfield, M. A., M. D. (Oxon.) Reprinted from *Van Nostrand's Magazine.* New York: D. Van Nostrand, Publisher, 1880. Price, 50 cents.

NOTES AND CLIPPINGS.

The New York and Boston Museums of Fine Art. — Mr. W. J. Stillman, writing from Florence to the *Nation* about the dispersion by auction sale of Prince Demidoff's treasures in the San Donato Museum, takes occasion to draw a comparison and contrast between the Metropolitan Museum in New York and the Boston Museum of Fine Arts. Says this critic: "It is, in fact, difficult for one who has made art collections a study to comprehend the policy which directs the operations of the Metropolitan Museum. If there were the hope of rivalling the British Museum, South Kensington and the National Gallery in one institution, the purchase at what after all were extravagant prices of a large collection of Dutch pictures to the exclusion of the better schools, of the Cesnola collection of Cypriote art at a cost which would have made a sample collection of art-work of all the centuries from the building of the Pyramids to the present day, etc., there would still be a doubt if the directors of the Museum were guided by sound policy; but when we know that instead of the resources of the whole British Empire we have only those of the city of New York, the laying of the foundations of a civic museum with such disproportionate acquisitions reminds one of a temple which is all portico. An hundred years would not make the Museum a fair representation of art-work at this rate. This is not judicious collection, but ignorant acquisition, and so far from exciting the admiration of the Old World, as some New Yorkers may imagine, it reminds the true collectors and students of collections of the frog who burst, rather than of the bull whom he emulated. The subject suggests a great many bitter comments which good-nature suppresses, and one need only say that, in what pertains to the soundest art culture, the policy which it is understood Boston is entering on will place her in an incontestable superiority to the metropolis before ten years have passed. The formation of art-collections is a thing which demands an amount of art-culture in the collectors which the New York direction do not seem to think it worth while to employ; and we may easily learn that the vanity of art-patronage is no match for the study and love of art, and that all the capital of New York thrown out in the reckless and unintelligent manner in which it has been thus far employed will not compete with the modest resources of the capital of New England under the direction of men who have made art their life-long study. We New Yorkers are as proud of the Cesnola collection as if we had bought a white elephant, and with equal reason. Boston, at a tithe of the cost, will cover the art of 5,000 years. It is not the way to work, and it is unworthy our American shrewdness to work in it. One-twentieth of the Cesnola collection and one-tenth of our Dutch gallery were worth to the metropolis as much as the whole. What is needed is intelligent selection and arrangement, not indiscriminate accumulation."

Competitions. — It is so seldom that we are called on to publish notices of competition of which we approve, that we are pleased to call attention to the two notices on page vii.

The Statue of General Custer, at West Point. — A special despatch from Washington says: A bill was recently introduced in the House for the erection in this city of a monument to the memory of General Custer, and the officers and men of the Seventh United States Cavalry, who were killed by the Sitting Bull band of Indians in the fight on the Little Big Horn river. The bill directs the Secretary of War to contract with Wilson McDonald, of New York, for the erection of the monument, "which shall include duplicates of the sculptor's equestrian and pedestrian figures of the late General Custer, and also the likenesses of the principal officers, and the names of the men who were killed in the battle of Little Big Horn." Commenting on the Custer monument at West Point, Mrs. Custer says, in a letter to Representative Daggett, of Nevada: "The statue could not be worse than it is. The face is of a man of sixty, and the dress so unmilitary that his brother officers shudder in looking at it. He is represented with full-dress coat, and top-boots that only belong to undress uniform. The whole costume is incongruous and incorrect. Then he is armed, like a desperado, in both hands, while some of the General's best charges were made with no fire-arms about him. I realize that I am the last one on earth to be satisfied with any representation of my husband. Nothing could portray to me in any form my idea of him. But his friends in civic life, his comrades in the army, and artists, all have but one story to tell — that the statue is a failure as a likeness, as the representation of a soldier, and as a work of art. It seems as if I could not endure the thought of this wretched statue being repeated, and I hope that your voice may influence those upon whom the decision rests." A later dispatch states that Mrs. Custer's remonstrance has been heeded, and the West Point statue will not be duplicated.

Blistering of Paint and Varnish. — Many are the opinions expressed regarding blistering, and although some very sensible theories are advanced, we are inclined to believe that the bottom of the subject has never been reached. We hold an opinion of the cause of this trouble, and it may be that this opinion has been forestalled by others; but as we have never seen the points laid down in print, we present them here. Blistering of a varnished surface, after the varnish has had proper time to harden, is due to the evaporation of moisture which lies confined under the shell of varnish. This evaporation is caused by heat, and it is seldom, if ever, a blister will rise upon a varnished surface without the temperature is raised to an extreme degree, near to that which the varnish received in its manufacture. The accumulation of moisture *under* the varnish may be brought about in several ways; the most particular one being in the closing in of moisture in the rough stuff. During the rubbing of the rough stuff the water used is partly absorbed, and unless due care is taken to give ample time for "drying out" before the application of subsequent coats, a great amount of moisture will be confined within the cells of the rough stuff. Boiled oil contains moisture, as of water, and in cases where steam is used to express the oil from the seed this percentage is increased. Turpentine, an extremely volatile liquid, also forms an evaporating substance which is rendered active by a slight heat, and in its haste to reach the air it disturbs the outer surface, either lifting an elastic coating into bubbles or blisters, or bursting open a hard and inelastic one into cracks. The primary cause, then, of blistering is moisture either in the form of wet moisture or of evaporating liquids, such as turpentine. The wood may be unseasoned, or it may have been wetted in the course of preparation, such as steaming to bend, etc. The rough stuff water may have been applied before the evaporation of liquids had taken place; either of which would bring about disastrous results.

"Dry blistering" is simply the hasty absorption of the liquids from outer coats by porous putty or paint, which deprives the coating of the requisite amount of binding and adhesiveness. To prevent blistering, close up every lurking-place for moisture, and be careful to have each coat dry before applying another. — *American Coach Painter.*

Improvements in Chromo-Lithography. — A process of printing many colors at one impression is said to be in succesful operation in Paris. The following account gives a fair popular notion of its nature: "The pigment for the ground color is formed into a solid block of the required thickness, to the surface of which the design, traced in artificial talc, is transferred by mere pressure. All the parts of the block that do not form the ground are then cut out by hand with a sharp knife set in a jointed parallelogram, so as to be capable of moving in all directions in a horizontal plane, but at the same time kept rigidly vertical. The spaces thus cut out are then filled by pouring in the hot liquid pigments corresponding to the colors or shades that are to be represented, pieces of wood, soaked in water, serving to complete the sides of the temporary mould. When cold, the recently-added color is trimmed off by the knife and another poured in. In the case of a large design, several operators are engaged at the same time on different parts, which are afterwards fitted together; and the method is being tried of cutting out the pattern in wood or metal, by the hand-saw, and forcing the dies so cut out into the block of ground-color by means of a hydraulic press, thus forming the pattern at once. When the whole mosaic, as it may be called, is complete, it is placed in a press somewhat resembling that used for lithography, and the upper surface is shaved off so as to render it true and level. The surface is also slightly moistened with a suitable combination of chemicals, and the material to be printed on is placed thereon, face downwards. A frame carrying six rollers is then passed once or twice backwards and forwards over the material resting on the block. A perfectly clear impression is thus obtained, and, in the case of textile fabrics, the color goes completely through their substance. After exposure for a few moments over a hot plate, to drive off the fumes of the chemicals employed, the work is finished.

The Norseman Statue for Boston. — A model has been accepted, it is said, for the bronze statue of Lief, the Norseman, who visited America nearly nine hundred years ago, and a site for it has been designated in Post Office Square, at Boston.

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BUILDING INTELLIGENCE.

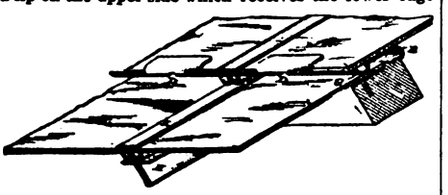
[Reported for The American Architect and Building News].

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

224,608. GLAZING.—William E. Rundle, Westminster, England. This invention provides a means of glazing a roof without the use of putty. Horizontal bars of sheet-metal are formed as shown, with a lip on the upper side which receives the lower edge



of the pane of glass, while the upper edge of the pane below is received in the slot that is formed on the under side of this bar. This slot is made deeper than the slot formed by the lip on the upper side, so that it is always possible to take out a single pane without disturbing the others: as will be seen, the pane can be slipped upward into the slot until its lower edge is clear of the lip, when it can be easily lifted out. A hole is left at D, so that any water that may be caught under the lip will be discharged onto the pane below. Also a gutter, G, is formed with a similar outlet, which collects and delivers any moisture that may have condensed on the under side of the glass. The portions of the bar between the lips are slightly recurved so as to form a wind-guard, and prevent the wind from blowing off the glass. The vertical joint of one pane with the pane adjoining in the same row is formed by simply lapping one over the other, or the bars, K, are used, which are made of a single piece of sheet-metal, whose form and the manner of using are clearly shown in the cut. The whole can be supported on wooden rafters and purlins, or T-irons, as shown.

226,823. THRESHOLD STRIP.—Alva Baird, Malcom, Iowa.

226,834. STEAM-CONDUCTING PIPE.—Jacob Brosius, Belleville, Ill.

226,841. VISE.—Clark Fisher, Trenton, N. J.

226,846. SAFETY-DEVICE FOR ELEVATORS.—Henry C. Goodrich, Chicago, Ill.

226,901. MACHINE FOR MAKING METALLIC LATHS.—Charles H. Carter, San Francisco, Cal.

226,908. APPARATUS FOR PURIFYING OR COOLING AIR.—Joseph Edwards, New York, N. Y.

226,912. MACHINE FOR TURNING BALUSTERS.—Philip M. Haas, Warren, O.

226,919. FIRE-EXTINGUISHING APPARATUS.—John B. Logan and Abner Greenleaf, Baltimore, Md.

226,935. STEP-LADDER.—Don Carlos Smart, Cambridgeport, Mass.

226,943. STEP-LADDER.—John M. Valley, Jersey City, N. J.

226,961. SEAL-JOINT TRAP FOR WASHSTANDS, ETC.—Jos. Bennor, Philadelphia, Pa.

226,968. HOLLOW-AUGER.—Orville M. Brailey, Amherst, Mass.

226,981. ELEVATOR.—Stephen B. Conover, New York, N. Y.

226,983. COMPOSITE TILE ROOFING.—William Dale, New York, N. Y.

226,992. ATTACHMENT FOR FIRE-PLACES.—Frank S. Elsberry, Montgomery, Ala.

227,001. CURTAIN-FIXTURE.—Benjamin Handforth, Hoboken, N. J.

227,012. PENCIL SHARPENING GUIDE.—Jehiel K. Hoyt, Newark, N. J.

227,051. WEATHER-STRIP.—Samuel A. Piper, Newton (Upper Falls), Mass.

227,057. FASTENING FOR TOOL-HANDLES.—Levi H. Roberts, Cadillac, Mich.

227,062. ROCK-DRILL. George P. Schaurer, Nashville, Tenn.

227,080. ROOFING AND PAVING MATERIAL.—Cyrus M. Warren, Brookline, Mass.

9,174. DOOR-HANGER.—Alexander N. Monteer, Kansas City.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS.—The following building permits have been issued since the last report:—

Theo. J. Griffin, three-story brick building, 314 Gay St., between Aisquith and Mott Sts.

W. A. L. Stolch, three-st'y brick dwell., cor. Madison Ave. and Wilson St., 22' x 80'.

Chas. Treusch, 6 two-st'y brick buildings on Alice Ann St.

W. H. Lotz, three-st'y brick building, 193 Conway St., near Warren St., 17' x 55'.

A. A. Rheinhardt, 3 three-st'y brick buildings on Calvert St., near Townsend St.

Alex. Weiller, 5 three-st'y brick dwells., Baltimore St., between Stricker and Gilmor Sts.

Alex. Weiller, 8 three-st'y brick dwells., on Montrose St., between Stricker and Gilmor Sts.

Church of the Redeemer, one-st'y stone Lecture-room on Bolton St., between Lanvale and Townsend Sts.

Malcolm Creighton, addition and improvement to warehouse, 133 Holliday St., near Franklin St.

Mrs. M. Miller, three-st'y dwell. on Riverside Ave., between Fort and Randall Sts.

Theo. Madden, three-st'y brick dwell., cor. Cuba and Andre Sts.

Henry Broughman, three-st'y brick dwell., Decatur St., near Nicholson St.

One hundred and seventy-four building permits were issued during the month of May.

HOUSES.—Mr. C. P. Paine is about to build a fine, large dwell., 25' x 85', on St. Paul St., near Chase, to be three stories high, and have a Mansard roof; to cost, $25,000; the front is to be of marble; Mr. Chas. L. Carson is the architect.

Mr. Geo. Blake is building 4 three-st'y dwells., on North Charles St., near John St., 22' x 75'; two will have marble fronts, and two, green serpentine-stone fronts; cost $30,000; Mr. Chas. L. Carson is the architect.

Ground has been broken on the east side of Calvert St., north of Fager, for six houses, 20 feet front, of brick and terra-cotta; four, 18 feet front, of Ohio sand-stone; and four, 18 feet front, of red brick and Cheat River blue-stone, for the McKim estate. Mrs. C. L. McKim is also to build a dwelling, 20 feet front, next to the corner of Calvert and Chase Sts., of brick and terra-cotta with red granite base. The entire work is from the designs of J. A. & W. T. Wilson, architects, and under their superintendence.

NEW BUILDING FOR BAY-VIEW.—An ordinance appropriating $50,000 for a new building for Bay View, came up as a special order in the City Council, Monday, April 26th after considerable discussion, in which several amendments were offered to reduce it $25,000, and rejected, it finally passed, making the appropriation $50,000.

WHARF.—Both branches of the City Council have passed an ordinance appropriating $5,000 to build a wharf at the boarding station at Hawkins's Point (Quarantine), and work will commence immediately.

Boston.

BUILDING PERMITS.—*Brick.—Cor. Chauncy St., and Exeter Pl.*, for H. H. Hunnewell, 1 store, 76' x 106', five stories; F. H. Tarbox, builder; G. R. & R. G. Shaw, architects.

Commonwealth Ave., No. 266, for F. H. Appleton, 1 dwell., 30' x 74', three stories; Vinal & Dodge, builders; Peabody & Stearns, architects.

Bismark St., for Haffenreffer & Co., 1 boiler house, 24' x 27', Jas. McMorrow, builder.

Beach St., No. 155, for H. G. Hall, 1 store, 36' x 58', four stories. Woodbury & Leighton, builders.

Beacon St., No. 242, for T. D. Boardman, 1 dwell., 31' x 44', four stories.

Cor. Essex and Lincoln Sts., seven stores, 26' x 64', four stories; Webster & Dixon, builders.

Newbury St., for T. F. Cushing, 1 stable, 22' x 66'; Vinal & Dodge, builders.

Wood.—Schuyler St., for J. F. Wetherbee, 1 dwell., 24' x 31'; H. A. Wood, builder.

Lexington St., Ward 1, for G. W. Bennett, 1 dwell., 23' x 34'; Frame & Patten, builders.

Centre St., Ward 23, for B. Clark, 1 dwell., 25' x 41'.

Waverley St., Ward 21, for D. Kennedy, 1 store-house, 28' x 28'; E. H. Sawyer, builder.

Mt. Bowdoin Ave., for W. Bellany, 1 dwell., 45' x 40'.

PERMITS, 4 months, ending April 30:—

Brick	101
Wood	153
Repairs, etc.	693
Boilers and engines	117

Being 50 % in excess of last year.

DEPOT.—The new Passenger Station of the Boston & Albany Railroad on Kneeland St., will be of brick and granite; Mr. A. R. Esty, architect.

HOUSES.—Mr. J. H. Besarick is the architect of a house on Montana St., near Grove Hall, for Mr. A. M. Gardner; contract awarded to S. M. Chesly; cost, $6,000.

On Commonwealth Ave., are building five houses for Messrs. A. A. Wheelock, C. B. Wilson, Wm. Noble and Dr. Wm. Baker; Mr. Geo. A. Avery, architect.

STORES.—There being no prospect of securing the extension of Hamilton Place to Washington Street, it is said that the trustees of the Hemenway estate will build upon the site of the old Marlborough Hotel and the Lowell Institute Hall.

Brooklyn.

BUILDING PERMITS.—*South Third St.*, 1 three-st'y brick and stone Dispensary and Hospital, 75' x 22'x 45'; cost, $13,000; owner, Brooklyn E. D. Dispensary and Hospital Association; architect, C. C. Buck; builder, John D. Anderson and S. M. Weeks.

Seventh Ave., 10 three-st'y brick flats, each 17'8" x 45'; cost, each, $3,000; owner and architect, Thos. Corrigan, 648 Sixth Ave.; builder, Wm. Corrigan.

St. Mark's Ave., 4 three-st'y brown-stone dwells., each, 20' x 50'; owner, J. E. Styles, 752 Union St.

Park Ave., cor. Sandford St., 1 two-st'y brick machine shop, 35' x 97'6'; cost, about $5,000; owner, John Clark, 675 Willoughby St.

Lefferts Pl., 2 three-st'y brown-stone dwells., 22' and 18' x 45'; owner, Wm. Kennedy; builder, A. A. Reeves.

Vernon Ave., 5 two-st'y frame dwells., each 18'9" x 38'; cost, each, $2,300; owner, B. F. Boreum; architect, Isaac D. Reynolds; builder, Thos. E. Greenland.

Greene Ave., 6 three-st'y brown-stone dwells., five, 19' x 48', and one 28' x 45'; cost, each, $7,000; owner and builder, Levi Fowler; architect, W. H. Baker.

Grove St., 1 two-st'y frame dwell., 38' x 38', with extension 15'6" x 18'; cost, about $7,500; owner, Henry Hulsberg, cor. First and North Eleventh Sts.; architect, A. Herbert; builders, Henry Grasman and John Stocks.

Laqueer St., 1 three-st'y brick tenement, 21'3" x 40'; cost, about $3,000; owner, Edward Keogh, 482 Court Street; builder, Thos. Keogh.

Putnam Ave., No. 757, 1 two-st'y brown-stone dwell., 20' x 40'; owner, Jas. McAlley, 761 Putnam Ave.; architect, F. M. Bickford; builder, John Softy.

Park Ave., 5 two-story brown-stone dwells., each 20' x 45'; owner, John Monas, 187 Bergen St., builder, J. J. Gilligan.

CHURCH.—The new church for Sixth Ave. Baptist Society, at the cor. of Sixth Ave. and Lincoln Pl., which was begun some three weeks ago, will have an auditorium 60' x 60', and a Sunday-school room 80' x 30'.

Chicago.

DEPOTS.—A permit has been issued to the Pennsylvania Railroad Co., to build a passenger and baggage depot at the corner of Canal and Madison Sts., at a cost of $225,000.

The Chicago & Northwestern Railway Co., have abandoned the million-dollar-plan, and will build a modest structure to cost $175,000, on Kinzie St., at the corner of Wells. The joint depot at Canal and Madison Sts., will be built as projected.

WAREHOUSE.—Ground has been broken at the corner of Franklin and Adams Sts., for Mr. George Armour's new building, which will cost $170,000.

BUILDING PERMITS.—C. D. Martin, two-st'y dwell., 215 Third Ave.; cost, $4,000.

J. Moerschbaecker, three-st'y store and dwell., 216 Rush St., for $6,500.

J. Vandressek, two st'y dwell., 576 Centre Ave.; cost, $3,000.

E. B. Leland, two-st'y dwell., at 414 and 414½ West Monroe St.; cost, $8,000.

Pennsylvania Central and Pittsburgh and Fort Wayne Railroad Companies, three-st'y depot and baggage house, corner of Canal and Madison Sts.; cost, $250,000.

A. Ryerson, three-st'y store and dwell., cor. Archer Ave and Butterfield St.; cost, $8,000.

John Bismark, two-st'y dwell., cor. Sixteenth and Morgan Sts.; cost, $2,000.

Barth & Meyer, warehouse, 421 Illinois St.; cost, $2,000.

Cincinnati.

WORK IN APRIL.—During the month of April the following building permits have been issued by the Board of Public Works:—

Michael Gily, three st'y brick; cost, $3,100.
Wm. Muller, one-st'y brick; cost, $5,000.
Wm. Coller, two-sty brick; cost, $1,500.
S. H. Foster, 2 four-st'y bricks; cost, $6,000.
John P. Shur, two-st'y brick; cost, $2,400.
Mrs. T. Flaig, three-st'y brick; cost, $3,500.
W. H. Harrison, four-st'y brick; cost, $8,000.
Wm. Goldkamp, two-st'y brick; cost, $3,500.
S. W. Smith, two lime-stone fronts; cost, $7,000.
P. Britt, two-st'y stone-fronts; cost, $6,000.
James Griffith, 2 stone dwells.; cost, $15,000.
H. H. Hoffman, three-st'y brick; cost, $2,500.
L. Denning, two-st'y brick; cost, $2,400.
Gabriel Stadler, two-st'y brick; cost, $2,500.
H. Heiners & Co., four-st'y brick; cost, $5,500.
James Griffith & Son, two-st'y brick; cost, $13,000.
John Drott, two-st'y brick; cost, $2,000.
Thos. Emery's Sons, 10 two-st'y brick; cost, $8,000.
Peace, Atkins & Co., three-st'y brick; cost, $5,000.
La Kamk & Wueefeck, three-st'y brick; cost, $4,500.
45 permits for repairs, total cost, $23,100.
Total permits for the month, 65.
Total cost for the month, $129,500.
Total cost to date, $501,575.
Total permits to date, 214.

BUILDING PERMITS.—C. Moerlein, addition to two-st'y brick, Henry St., near Elm; $3,000.

Cincinnati Enquirer Company, addition to three-st'y brick, Vine St., near Sixth; $1,200.

James Griffith & Sons, to alter four-st'y brick, northwest corner Fourth and Race Sts.; $1,200.

Edgar M. Johnson, two-st'y stone front, Elm and McMillan St.; $15,000.

H. H. Hoffman, three-st'y brick, Elm St., near Front; $2,500.

G. Stodler, two-st'y brick, Browne St., near Baymiller; $2,500.

Herman Tapke, four-st'y brick, Sycamore St., near Webster; $5,500.

F. Marmet, addition to three-st'y brick, cor. Central Ave. and Charles St.; $1,500.

New York.

BUILDING PERMITS.—*Greene St., Nos.* 20, 22, 24, and 26, two six-st'y iron front warehouses, each 37'8" in front and 84' to 92' deep; cost, 40,000; Samuel Inslee, Jr., owner; Samuel A. Warner, architect; Richard Deeves, builder.

Fourth Ave., cor. One Hundred and Tenth St., four-st'y brown-stone front apartment house; 20' x 75'; cost, $18,000; S. F. Treacy, owner; Charles W. Romeyn, architect; James Frame, builder.

One Hundred and Tenth St., 3 three-st'y brown-stone front dwells., for same owner; cost of each, $14,000.

Seventy-ninth St., three-st'y brown-stone dwell., 22' x 45'; cost, $8,000; Hiram Bowman, owner; A. B. Ogden, architect; William Picken, builder.

Fifty-seventh St., J. H. Valentine, architect, Jno. Livingstone, owner and builder, 5 five-st'y brown-stone flats, 22'6" x 65'; cost, 70,000.

One Hundred and Twenty-Second St., A. S. Birdsall, owner and builder, J. H. Valentine, architect, 5 brown-stone dwells.; cost, $45,000.

Sixty-seventh St., for D. Hennessy, Thom & Wilson, architects, 2 brown-stone dwells., 25' x 61'; cost, $50,000.

Jay St., Nos. 37, 39, and 41; for Thos. Patten, H. M. Reynolds, architect and builder, 3 brick stores, 22' x 70'; cost, $25,500.

One Hundred and Fifth St., for Ann E. Davis, J. H. Valentine, architect, J. B. Davis, builder, 5 brick flats, 20' x 60'; cost, $50,000.

One Hundred and Seventeenth St., for A. M. Jenney, J. H. Valentine, architect, Jacob Jenney, builder, 3 brick flats, 16'8" x 50', and extension; cost $27,000.

One Hundred and Fifth St., for Ann E. Davis, J. H. Valentine, architect, A. B. Davis, builder, 2 brown-stone dwellings; cost, $18,000.

ALTERATIONS.—*Fifth Ave., No.* 144, extension on rear to be raised to two stories; cost, $2,500; owner, Cottier & Co.; architect, R. Fenton.

Avenue A, cor. Fourth St., new store front on first story, new stairs and interior alterations; cost, $2,200; owner, George Agne; architect, Chas. Sturtzkober; builder, John Schmitt.

Fifth Ave., No. 634; one-st'y and basement brick extension on rear, 15' x 13'; also two bay windows on

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first st'y; cost, $5,000; owner, D. O. Mills; architect, C. W. Clinton; builder, D. H. King.

Broadway, No. 63, rear of building to be raised five feet, 3d, 4th, and 5th floors to be divided into offices; cost $25,000; owners, Vandawater Smith and The Mining and Developing Co.; architect, Stephen D. Hatch; builder, R. L. Darragh.

West Fourteenth St., No. 114, to be changed to store and offices; two-st'y brick extension on rear 25' x 50'; new store front and interior alterations; cost, $4,000; owner, A. B. Woodhouse; architects, West & Anderson.

Franklin St., No. 199, three brick ovens and a new chimney 75' high; cost, $75,000; lessees, Holmes & Co.; builder, A. Crumble.

Catharine St., No. 32, extension 26'6' x 50' on the rear; cost, $2,000; owner, Wm. Hart; builder, Robert Huson.

Market St., cor. East Broadway, to be raised to five stories, exterior and interior alterations; cost, $5,000; owner, Thos. Sheils; architect, Thos. Godwin.

Broadway, Nos. 234 *and* 235, two stories to be added, front and rear walls to be taken down and rebuilt, and interior alterations; cost $47,000; owner, Thos. Maddock; architect, G. L. Morse.

Broadway, No. 57, brick vaults and partition walls to be constructed in cellar; cost, $3,500; owner, Charter Oak Life Ins. Co.; builder, Elward Smith.

Bank Building.—Mr. David H. King is taking down the building on the corner of Broadway and Wall St. The work is to be completed by the 5th of June.

Exchange Building. — The Stock Exchange has adopted the plan of Mr. James Renwick, architect, for the enlargement of their building. The work of alteration is to be begun on May 1, and the expenditure is limited to $300,000.

Home for Poor Boys. — The East Side Boys' Lodging-house and Industrial School, on the corner of East Broadway and Gouverneur St. is almost completed. It will be capable of acommodating 300 boys comfortably.

Houses. — On Fifty-fourth St., between Fifth and Sixth Aves., two fine houses are to be built from designs of Messrs. D. & J. Jardine. The dimensions are 25' x 70'. Fronts will be brown-stone. One is for Jno. Hall Deane and the other for W. A. Cauldwell.

Printing-House. — On lots Nos. 22 and 24 West Thirteenth St., a printing-house, 50' x 100', is to be built of Philadelphia brick with stone finish, for Messrs. Ogden and Clark. Mr. Jas. Stroud is the architect, and Messrs. H. B. & A. L. Weeks will be the builders. The cost will be about $44,000.

Stores. — Altmann's store on Sixth Ave. is to be enlarged to about three times its present dimensions, at a probable cost of about $100,000. Messrs. D. & J. Jardine, are the architects.

No. 370 Broadway is being rebuilt for Hon. Jno. Jay. It is to be of brick, with stone and terra-cotta finish, 25' x 150' in size. Cost, about $40,000. Messrs. D. & J. Jardine are the architects.

The adjoining stores are being built from designs of Mr. Jas. B. Snook, for the Lorillard estate, and Mr. S. D. Hatch for the store being built by Mr. R. L. Darragh.

Philadelphia.

Additions.—*Cor. Germantown Road and Canal*, two stories added to factory, 30' x 40'; H. Brockelhrost, contractor.

Norris St., second st'y added to a factory, 44' x 70'; Jesse W. Taylor & Sons, owners.

Montgomery St., cor. Tulip, three-st'y addition to dwell., 18' x 29'; W. Bartholomew, contractor.

Jefferson St., between Wakefield and Railroad, two-stories added to factory, 22' x 39'; Eli Leach, contractor.

Dock St., one st'y to add to depot, 59' x 94'; Penn. R. R. Co., Third St., and Willings Alley, owners.

Frankford Road, two stories added to factory, 20' x 40'; E. G. Ritter, owner.

Church. — Ground has been broken at Twenty-eighth St. and Susquehanna Ave., for the Church of St. Chrysostom. It is an enterprise begun by the Rev. Charles S. Daniels.

Chapel.—*Lee St.*, West of Eighteenth. one-st'y chapel, 80' x 36'; W. Kess, contractor.

Factories.—*Linn St.*, four-st'y factory, 49' x 140'; C. Tweed, contractor.

Houses.—*Ruscomb St.*, 2 three-st'y dwells., 16' x 42'; Robert J. Siddall, owner.

Thirty-sixth St., cor. Rockland, 4 three-st'y dwells., 15' x 46'; W. S. Ray, owner; J. Wilson, contractor.

Airy St., three-st'y dwell., 21' x 32'; Jno. McAlarnen, contractor.

Ninth St., three-st'y dwell., 18' x 56'; Henry Hotzel, contractor.

Twentieth St., cor. Callowhill, three-st'y dwell., and hall, 27' x 65'; A. Catanach, contractor.

Dauphin St., two-st'y front building, 18' x 20'; Sam'l Stewart, contractor.

Terrace St., three-st'y dwell, 18' x 50'; Staley and Davis, contractors.

Eighth St., 7 dwells., 17' x 48'; Benj. Ketcham & Son, contractors.

Montgomery Ave., three-st'y dwell, 20' x 50'; A. T. Richmond contractor.

Prospect St., near Kibben St., three-st'y dwell., 20' x 32'; Christian Kern, owner.

Machine Shop.—*Twenty-third St.*, cor. Turner. one-st'y machine shop and foundry, 40' x 240'; Rush, Whiteside & Co., contractors.

Newspaper Office. — It is stated that Mr. G. W. Childs is to build a new home for the *Ledger*, the plan of which is to be selected in competition.

Savings Bank. — A four-story brick and fire-proof building, 140 feet deep, is to be built on the southwest corner of Twelfth and Chestnut Sts., by the Beneficial Savings Fund Association. The bids of contractors for the building will be opened this week.

Stores.—*Second St.*, three-st'y store and slaughter-house, 18' x 45'; F. A. Burkle, contractor.

South St., No. 214, three-st'y store and dwell., 17' x 22'; M. McConnell, contractor.

Stable.—*Cammuselt St., No.* 1817, two-st'y stable, 31' x 30'; J. S. Cornell, contractor.

Springfield, Ill.

Houses. — *South Seventh St.*, two-st'y frame cottage, 7 rooms; cost, $1,500. Fred D. Buck, owner; Geo. H. Helmle, architect.

Cor. Eighth and Clay Sts., one-and-a-half-st'y frame cottage, 6 rooms; G. C. Honehens, owner; cost, $1,465. Geo. H. Helmle, architect.

Cor. Fifth and Scarritt Sts., two-st'y frame dwelling, 8 rooms; Louis F. Deyo, owner; Geo. H. Helmle, architect.

Cor. Seventh and Allen St., remodeling residence for Wm. S. Allen; cost, $1,000. Geo. H. Helmle, architect.

Church. — A Christian church to cost $8,000 will be built during this season, at the cor. of Fifth and Jackson Sts. S. S. Bullard, architect.

Alterations. — The Springer building, on cor. of Sixth and Monroe Sts., is being remodeled; cost, $3,000. Booth & McCosker, owners.

St. Louis.

Building Permits. — Fourty-four permits have been issued since our last report, five of which are for frame structures, of slight importance. Of the rest, those worth $2,500 and over, are as follows: —

Owners Name.	Use.	Stories.	Rooms.	Cost.
Excelsior M'f'g Company,	F'ct'y.	1	1	$8,000
Wm. Wellmann,	Dwell.	2	2	3,200
Wm. Pampenier,	Dwell.	2	20	7,000
C. E. Nixdorffe,	F'ct'y.	2	2	7,000
Frazier Lubricating Co.,	F'ct'y.	2	2	5,000
John Steininger	Dwell.	3	12	4,500

General Notes.

Allentown, Pa. — Mr. Oscar E. Holman is building a brick house with marble finish, size 24' x 54', on Sixth St., costing about $7,000; Mr. L. S. Jacoby, architect.

Dr. H. K. Hartzell is about to build a fine house on the cor. of Walnut and Eighth Sts., to be of brick with marble finish, size 40' x 45'; cost, $12,000. Mr. L. S. Jacoby, architect.

Attleboro, Mass. — The town has voted $6,000 for a new school-house.

Bristol, R. I. — Mr. F. A. Carpenter, of the Bristol Hotel, is building, at Mount Hope, two buildings, one 22' x 75', two-stories high, the other 30' x 100', one-story high.

Concord, N. C. — J. A. & W. T. Wilson, architects, of Baltimore, are making drawings for a country house in this place for Mr. Jas. C. Gibson.

Dubuque, Io. — F. D. Hyde, architect, is preparing plans for a row of five two-story houses, brick and stone, to be built on Locust St., near the post-office, for Messrs. Andrews & Treadway.

Eaton Rapids, Mich. — The Methodist Episcopal Church Society will build a church, costing $8,000, this summer.

Florissana, Mo.—Erastus Wells, president of the West End Narrow-Gauge Railroad, is building a hotel on the depot grounds, 107' x 34', and two-stories high.

Fredericksburg, Va. — The corner-stone of the French Memorial Chapel of the Presbyterian Church was laid April 29.

Hagerstown, Md.—A memorial tower is to be placed upon the Protestant Episcopal Church on Prospect St. The plans for the tower and spire are to be furnished by Mr. Bushman Schley, the architect of the church.

Hyde Park, Ill. — Ground was broken, April 26, for the combined shops of the Pullman Palace Car Company and the Allen Paper Car Wheel Company, on the Illinois Central Railroad. The works will occupy 160 acres; will cost about $125,000, and be completed about October 1. Between 300 and 400 cottages will be built. The new town will be called Pullman. Mr. S. S. Beman, of New York, is the architect. The material will be pressed brick of two colors, with stone. The structures will consist of two parallel erecting-shops, 87' x 600', and three-stories high, with a tower 136 feet high. Back of these are four buildings, covering an aggregate frontage of 1,047 feet, with a general depth of 200 feet. Still back of these is another erecting-shop, 494' x 86', a dry-kiln 150' x 80', and a foundry 130 feet front and 200 feet deep. The contractors are Messrs. Price & Avers.

Jamestown, N. Y. — A new public school is to be built.

Jeffersonville, Ind. — Mrs. Zulauf is building four new cottages on Canal and Chestnut Sts.

Lancaster, Pa.—Mr. F. E. Davis, architect, Baltimore, has just completed drawings for a public school, 74' x 90', two stories high; cost, $25,000.

Louisville, Ky.—The Bar Association is considering the practibility of putting up a building.

J. L. Deppen is to build a three-st'y brick dwell., on Third Ave.; cost, $7,500.

Wm. P. Frederick is to alter a two-st'y brick dwell., on Gray St., cost, $1,200.

J. C. King is to enlarge a one-story brick chapel on Sixth St., near Green; cost, $2,600.

Minneapolis, Minn. — The contract for the new Methodist church has been let. The cost of the building will be about $50,000.

Montague, Mass. — The Prospect Block will be 37' x 44'; R. M. Startnek, owner.

Monument, Mass.—A new depot is to be built at Monument Beach.

Mt. Vernon, O.—Mr. George W. Bunn, is building a fine house on East High St.

Mt. Zion, Md.—Subscriptions are being made for the erection of a new Reformed Church at Mt. Zion, between Frederick and Jefferson. Over $1,000 have already been subscribed.

New Marlboro, Md.—Mr. F. E. Davis, of Baltimore is preparing drawings for a new Court House; cost, nearly $20,000.

Newport, R. I.—New houses are to be built at once for Mrs. H. N. Pond, Mr. Charles Post, Mr. Edward Mayer, Mr. Ball (of Ball, Black & Co.), all of New York, and possibly Mr. Robert Mackie, the California millionaire.

Pittsfield, Mass.—It has been decided to build a school-house in the rear of that now standing at Renfrew.

Plainville, Mass. — Mr. Fenner Hawkins is building a house.

Portland, Mich.—A $10,000 opera-house is being built here.

St. Paul, Minn.—The Northern Pacific has secured nearly twenty acres of ground, and has already begun work on the handsome building which is to become headquarters for the Company's army of officials. A mammoth freight house is also to be begun in a short time.

The new Chicago, St. Paul, Minneapolis and Omaha is also about building its shops on forty acres of land it has secured for the purpose, besides which a fine building has been planned for headquarters.

The Chicago, Milwaukee and St. Paul road will soon build immense freight-houses on the river bank, 1,800' long by 100' wide.

Toledo, O. — The Wabash Elevator Company of this city is to build another mammoth elevator, with a capacity of 1,600,000 bushels. It will be 341 feet long, 104 feet wide, and 145 feet high. There will be 270 bins, and 28 loading and unloading elevators.

Wellsborough, Pa.—Mr. W. H. Hayes, architect, of Elmira, N. Y., is building for Wright, Bailey & Hastings, a brick and stone block of three stores; cost, $7,000.

West Eaton, N. Y.—A new Catholic Church will be built.

Westfield, Mass.—The Episcopalians have secured a lot on King Street, and will soon begin to build a new chapel.

West Newton, Mass. — A house for Mr. C. W. Leatherbee, on Mt. Vernon St., is to be begun in a few weeks. Cost, about $7,000. Contract not yet awarded. Mr. J. H. Besarick, of Boston, is the architect.

Wilmington, Del. — The new court house is rapidly approaching completion; will soon be ready for the iron roof. Mr. T. P. Chandler, of Philadelphia, is architect.

Worcester, Mass. — The foundations of a house for Mr. G. Henry Whitcomb, are now in place. The building will be of granite from Monson, Mass. W. F. Flint & Co., of that place are the masons. The building measures 50 by 70 feet, and will cost $15,000. Mr. S. C. Earle, of Boston, is the architect.

Worcester, Mass.—Mr. C. Morton is to build the enlargement of the Edgeworth Street School-house, for $4,750.

Industrial.

Augusta, Me.—The Sibley Manufacturing Company is making rapid progress in the arrangements to build a mill.

Bridgeport, Pa.—An addition, 77' x 139', and four stories high, is making to Mill No. 1, and a similar addition to Mill No. 2, 55' x 75', owned by James Sees & Sons.

Hamilton, Ont.—The new cotton factory will be completed by September next.

Iredell, Tex.—F. W. Carter is building a "New Process" four-run mill, and Owens & McDonald of Iredell have the contract.

Lockhaven, Pa.—The Kistler Brothers' tannery will be rebuilt.

Millville, Mass.—Messrs. Cook & Bannagan, of the Lawrence Felting Company, are about to build a new mill 125' x 44', three-stories high, and work is to be begun at once.

Naugatuck, Conn.—Scott & Brooks are building a new factory, 140' x 40'.

Northampton, Mass.—The Nonotuck Silk Company are to build a three-st'y mill, 100' x 40'.

New Bedford, Mass.—The Morse Twist Drill Company have purchased over 300,000 brick for their building

Orange, Mass.—The Orange Foundry Company has broken ground for a brick annealing room, 30' x 40'.

Partridgeville, Mass.—A. Hill and S. W. Amsden are building a 50' x 30' woolen mill.

Philadelphia, Pa.—Mr. John McCreight, Progressive Forging and Ship Smith Works, Beach and Norris Sts., will soon make a large addition to his establishment.

Pittsburgh, Pa. — Mr. W. F. Eichenlaub has begun to build a large brick furniture warehouse at Thirty-fifth and Butler Streets.

Thomas Wightman & Co., are building a new glass-house.

Springfield, Mass.—Messrs. Dwight & Hoyt are building a new brick factory; also an office-building.

Troy, N. Y.—The Messrs. Burden are building a large addition to their iron works. Extensive improvements are to be made to the Merchant mills of Corning & Co., the coming summer. There is also a rumor of a new mill to be built.

William Coutie & Son, intend to build on Mechanic St., a three-st'y brick addition, 90' x 40'.

Utica, N. Y.—The Mohawk Valley Cotton Mills are to build a mill, 250' x 90'.

Valley Falls, N. Y.—James Thompson & Co., are erecting a new building.

Wakefield, R. I.—Messrs Woods & Curtis are rebuilding their carriage-shop.

West Conshohocken, Pa.—A new mill 50' x 100', and two stories high, is building for Messrs. G. & J. Bullock.

West Point, Ga.—J. F. Manney is building a new two-run mill.

West Waterville, Me.—Messrs. Emerson, Stevens & Co., are to build a large addition to their scythe and axe shop.

Bids and Contracts.

Appleton, Wis.—C. Muensch, has let the contract for building the largest brewery in the State outside of Milwaukee. It is to be completed Sept. 1.

Boston, Mass.—The Committee on Improved Sewerage have awarded to Stoddard & Hillier, of Bangor, Maine, the contract for 4,000,000 of brick, at $8 per thousand.

Holyoke, Mass. — George R. Smith has the contract for the brick work on Mayberry's new High St. building. The wood work will be done by Jones Brothers.

New York, N. Y. — The Erie City, Pa., Iron Works have been awarded the contract for the wrought iron tubular lining for the Hudson River tunnel. Three years will be needed to fill the contract, which is worth $700,000.

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IT will be remembered by members of various local societies or chapters of the American Institute of Architects that at the last Convention of the Institute a strong feeling was manifested in favor of changing the relation of the national and the local bodies; a relation which appears to have become in many ways unfavorable to the best interests of both. After considerable discussion, it was thought best that the Convention should express no opinion on the subject until the views of the Chapters had been ascertained, and the matter was referred to the Trustees with instructions to communicate with the Chapters, and invite them to express their feeling on the subject, and to suggest models for a revised constitution of the Institute, in order that a well considered scheme might be submitted for the action of the next convention. Notice of this reference has been sent to the Chapters, and all of them probably have given it some consideration. The Boston Chapter, in a meeting held on Wednesday last, voted to adopt the report of a special committee, which we give in another place, and instructed their Secretary to communicate their action to the other Chapters of the Institute. We trust that this important movement will meet with the fullest consideration, and that the convention of November will be able to take definite action. The formal organization of chapters has been in some respects manifestly unjust to those isolated architects who find it hard to be compelled to belong to two organizations in order to be admitted to one of them, and a certain cumbrousness is imparted to the working of the Institute from the same cause. The more membership in the Institute comes to be regarded as an honor, pure and simple, which requires high character and attainment to get and keep, but demands little money or labor, the more will such membership be sought after, and the more influence will the society exert.

THE St. Louis architects seem to be a public-spirited body of men. It appears that about the first of April the journeymen stone-cutters in that city struck for terms so unreasonable that the bosses, accustomed as they were to the demands of what is usually the most unreasonable of all the unions, rebelled, and applied to the architects, stating their case in a circular letter, and asked their indulgence in cases where work had to be delayed, and for help to resist this "outbreak of socialism." The architects more than responded to their appeal, and thirty-five of them, with twenty-five builders, signed a paper affirming that they believed the boss stone-cutters to be right in the stand they had taken, and that those who had encouraged or aided the strikers in their course should not have their further patronage. It is pleasant to see men so much interested in the circumstances which surround their professional practice that they are willing to interpose in such a matter. Rightly or wrongly, mechanics usually look up to architects with a great deal of respect, and unless the latter forfeit this respect by gross incompetence, they can exercise a considerable influence over their less educated fellows. In this special case the expression of the architects' opinion is far too weak a weapon to have much effect upon the mulish folly of a union, and we should be sorry to see them throw their influence away; but their sympathy with the vexations of the master stone-cutters is, no doubt, a good thing, and will excite sympathy and confidence in return.

IT is with respectful gratitude that we take up and record the pearls of wisdom which fall from the lips of English magistrates concerning the rights and duties of the members of other professions. In the latest case where we find the judge acting also as witness for the defence, certain civil engineers had brought an action to recover what they asserted to be the ordinary commission, one and one-half per cent, for preparing plans for certain baths, the estimated cost of which was sixteen thousand pounds. The company which proposed to construct the baths did not deny having ordered the plans, and did not even dispute the price; their only ground for contesting the claim was, that the plaintiffs had done so much other work for them that they ought to "throw in" this item. The judge, however, supplemented this rather weak defence by announcing that the claim of one and one-half per cent on the outlay was "ridiculous." The plaintiffs, he said, were entitled to be "paid for their labor," but nothing more. It perhaps did not occur to his Lordship that the unfortunate engineers had spent large sums to acquire the knowledge and training which gave their "labor" its value, and that they were entitled to have from the rewards of their professional work reimbursement with interest for this outlay; that the natural aptitude for such work is as much property, and its exercise as much entitled to be paid for, as the talent of a painter or an opera-singer; that the responsibility of the designer, as well as the value of his services to his employer, increases in proportion to the outlay, and that it is as foolish to say that the work on plans for public buildings should be paid at the same rate per hour as on laborers' cottages, as it would be to maintain that a lawyer should receive no more for drawing a mortgage of a railroad than for a conveyance of a freedman's log-hut; at all events, the jury received no intimation that these considerations were to be regarded, and they awarded seventy pounds as payment, instead of the two hundred and forty claimed. This, we should say, would have paid for the paper and India-ink, and perhaps for the labor of the draughtsmen employed. The office-rent, pay of draughtsmen in the intervals of work, labor, care, supervision, family expenses, responsibility, training and talent of the designers, we suppose they were expected to contribute gratis. We knew of an architect once who worked for a dollar and a half a day, without regard to the character of the building on which he was employed: would it not be well to establish this as a minimum rate of wages, which other architects might under all circumstances be entitled to recover, whatever judges might think of the value of their services?

THE VERDICT IN THE MADISON SQUARE GARDEN ACCIDENT.

THE verdict of the jury on the fatal fall of the building called the Madison Square Garden, in New York, attributes the accident to the faulty construction of the building, censures the owners, the Harlem Railroad Company, for employing an engineer not conversant with construction, instead of an architect, and censures the Department of Buildings for allowing the structure to be erected contrary to law. It is new to have a corporation condemned for employing engineers to design its buildings, on account of their recognized incompetency for such work as compared with architects, but the latter profession will be grateful for the implied compliment. After all, the incompetency of the particular engineer employed in this case was demonstrated by his own evidence, and as the railroad company is unquestionably liable for the ignorance and recklessness of its employees, the verdict will have the effect of directing such suits for damages as may follow against that one of the joint defendants which is best able to pay, and this was perhaps the main point in the minds of the jury. The Department of Buildings is, we presume, above the law, even if a plain infraction of the statute could be proved. Now that the evidence is all in, it may interest those who profess the art of construction to review it, and try to disentangle a reasonable theory of the occurrence from the mass of conflicting opinions which were presented.

The facts are simple: a wall twelve inches thick, thirty-four feet high, and two hundred feet long, with return walls at each

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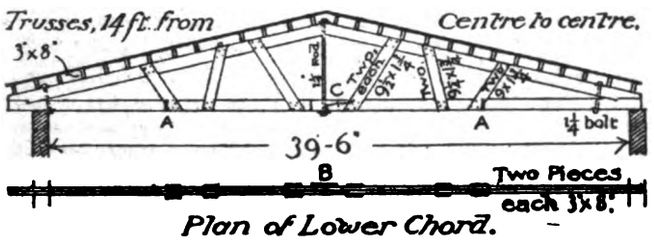
end, but no cross-partitions or girders, and no anchorage except a few irons inserted some fifteen feet from the ground to tie it to an independent framing of timber behind, formed one side of a building covered by a roof of forty feet span, supported by trusses of which we give a diagram, copied from the *Railroad*



Plan of Lower Chord.

Gazette. One evening, under no particular provocation, this wall, with the roof, fell outward, the dislocation commencing at the middle of its length. After the accident, several trusses were found broken: in all of them the tie-beam, which was made in several pieces spliced by spiking, had broken in the direction shown by the irregular line on the diagram, immediately under the king-rod, besides stretching some five-eighths of an inch by the bending of the spikes.

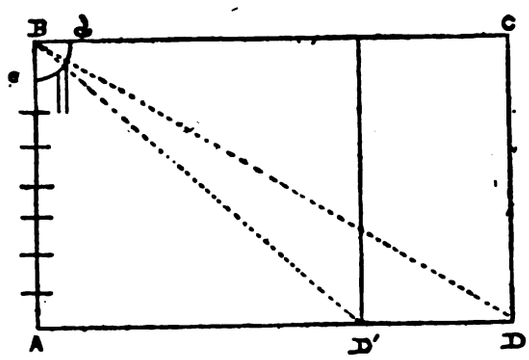
Leaving out the nonsense about the destruction of the strength of the roof by the heat of the room beneath, the injury to the wall or roof by dancing on the floor, the weakening of the wall by driving nails into it to hang pictures, or its crushing by the extra weight so added, which formed the bulk of the testimony, the preponderance of the opinions which are worthy of any respect is in favor of the theory that the built-up tie-beams of the central truss separated under tension, letting the truss fall, the thrust of the rafters pushing out the wall at that point, and inducing a general overturn.

With this view we confess ourselves unable to coincide. That the *tension* alone of so light a roof could tear apart such a tie-beam, even if feebly spiked, we cannot think likely, and if the beam had begun to stretch by the bending of the spikes, why did not the stretching continue? A nail partly drawn out yields more and more easily, and it would be strange if the beam should extend gradually half an inch, and then with a sudden jerk snap itself in two. Even supposing this possible, neither the form nor the position of the rupture is such as a failure of this kind would occasion. The natural place for the parting of this tie-beam would be at A or A', half-way between the suspension-rod and the bearing, where to a severe tensile strain is added the heavy cross stress caused by its own unsupported weight, increased in this instance by the weight of the principal rafter and its load, which by means of the pieces which form a burlesque of strutting is transferred directly to the tie-beam. The actual form and position of the break points, we think, to a downward pressure exerted upon the beam by the strut nearest the centre, resisted by the force of the king-rod, so that the wood, being unable to yield, was thrust apart by the action of the strut. It is not impossible that the quiescent weight on the rafters may have been sufficient to break off the tie-beam in this way; certainly the mode of strutting was well adapted to secure such a result; but the dimensions of the timbers render it unlikely unless a load of snow should add to the strain, while the effect would be perfectly accounted for by a previous movement of the wall dragging the truss off its bearing, and allowing its end to strike the floor as it fell. The inertia of the falling roof would then add force amply sufficient to drive the tie-beam asunder when its movement was stopped by an obstacle. The partial drawing out of the nails would also in such a crash be likely to occur simultaneously with the parting of the tie-beam, while this double action would be improbable under a protracted strain.

But when, leaving the roof, we regard the wall which supported it, it seems still more certain that this, as the weakest part of the whole construction, must probably have fallen first. Gross as was the ignorance displayed in the design of the roof, it is surpassed by the recklessness with which so serious a piece of construction as that of an almost unsupported wall, two hundred feet long, was disposed of.

If it were not for the complete lack of understanding of the principles involved which was shown by the builders summoned as experts in the inquest, we should hardly think of calling attention to the fact that in so long a wall there is no question of resistance to vertical pressure; that it is nonsense to talk about the weight of a score of pictures, or the vibration caused by the light feet of a few young dancers, being more than a twelve-inch wall of that height could support; the main element to be considered under such circumstances is the *stability* of the mass of masonry itself. It is plain that for a few feet from the return walls the brickwork would stand erect forever, held in place by them, under any pressure short of actual crushing strain; and it is no less evident that as the distance from the angles increased, their influence in retaining the wall would diminish, until at a great distance it became inappreciable, and the masonry could depend only on its own steadiness, that is, on the width of its base in proportion to its height, just as if it stood alone, and the rules for determining its thickness become those for independent walls, or columns standing alone. This principle is well known to architects, although their applications of it often savor somewhat of the "rule of thumb," rather than scientific deduction, and building laws recognize it by demanding that as the unsupported length increases, the wall shall be thickened; the New York law specifying that four inches shall be added for every ten feet above twenty-five feet in length, while the Boston statute contents itself with four extra inches for every twenty-five feet beyond the standard twenty-five.

The French rule, more scientific, is explained by the following diagram: —



The height of the given wall is set off at any scale on the line A B, and its length between the cross walls on A D, and a diagonal is drawn from B, the top of one end of the wall, to D, the bottom of the other end. From B to *e* is taken the thickness which would be required for an independent wall to secure the degree of stability required, this being, for ample steadiness, one-eighth of the height; for a moderate degree, one-tenth; and for the smallest permissible degree, one-twelfth. With this distance as a radius, an arc is described, cutting the diagonal B D in *d*, and a vertical drawn through this intersection includes between it and the vertical A B the required thickness of the wall at the given scale. If the wall is shorter, extending only from A to D', this process will indicate a less thickness, as the figure shows. Evidently, if the length between the cross-walls is infinite, the thickness will equal that of an independent wall, while a very small length will give a very slight thickness, with all degrees between.

The Madison Square Garden wall, though feebly tied, can hardly be said to have been securely anchored, even in the first story, while the upper story was practically unsupported. We will, however, assume that it was held firm at the second floor, and calculate its dimensions only for the portion above. By the French rule, for the smallest permissible amount of security this wall should have been about nineteen and a half inches thick; by the Boston rule it should have been three feet four inches; the New York law would require six feet ten inches. Three-fifths of the smallest standard was the actual thickness.

Here, we believe, is the true explanation of the accident. No builder would think of leaving a twelve-inch party wall twenty-five feet high over night without support, and the long wall of the Garden was little better: if anything, it is strange that it did not fall sooner. We have no desire to fix the responsibility on persons; that is not our province; but in the interest of good building it is impossible to discuss too carefully the circumstances of such accidents, and we think we shall express the conviction of many of our readers, as well as our own, in saying that whatever may have been the faults of the roof which fell, the wall was still worse, and that while buildings may be roofed as badly, and yet stand, the failure of walls so designed may be looked for with confidence.

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DETAILS OF SEWERAGE.[1]

IN laying out a system of sewers for a town, the first point to be settled is the location and level of the outfall. If the town happens to be on the banks of a deep river into which the sewage can be discharged without fear of contamination, as at St. Louis or Cincinnati, several outfalls can be had at convenient points, but if the sewage is to be delivered to the sea, or to be disposed of by irrigation or other artificial treatment, or if it be necessary to lift it by pumping, as is often the case in low-lying districts, then it becomes necessary to collect it as far as possible at one locality, where it can be treated as a whole. The location of the larger mains will generally be determined by the courses of the natural valleys, wherever the slope of the surface is considerable, while the lateral sewers will enter these mains at the intersections of streets, with such ramifications as may be suggested by the contour of the ground.

Modern practice requires all sewers which are too small to allow a man to pass through them for inspection to be built in straight lines broken by angles where change of direction is necessary, and these angles are always provided with either a man-hole for access, or a lamp-hole into which a lantern can be lowered. By this means any collection of sediment or other obstruction in any form can be readily located and removed. Changes of inclination should, for the same reason, be made at these holes; but in sewers of three and one-half feet height and upwards, curved lines are allowed. These curves should be carefully traced and made uniform and accurate. When towns are located on sloping or hilly sites with portions lying at the foot of these slopes, nearly level, as often may occur on river banks, it is important to guard against the sewers of the flat districts being flooded by the discharge of those on the slopes. In such cases the higher levels can be provided for by an intercepting-sewer passing along a contour line decidedly above the flat districts, into which all the sewers from the slopes should discharge, and which can be led to its destination without risk of flooding the lower streets by its contents. In all cases where the sewage of the lower part of a town has to be raised by pumping, this principle of *interception* is very important, in order to avoid pumping such sewage as can be delivered at the desired point by gravity. It is often worth while, if the works be on a large scale, to spend a considerable sum in cutting through hills or bridging valleys with such "high-level" intercepting-sewers, rather than to encumber the lower districts with their contents.

If the town is so densely peopled, or likely to become so, that the surface-water of the streets cannot properly be discharged directly into the water-courses, so that any considerable part of it must be provided for in the sewers, there is a good deal of judgment to be exercised in determining upon the proper quantity to thus provide for. If the sewers are made larger than needed, not only is capital wasted, but their self-cleansing power is impaired thereby. On the other hand, if made too small they become gorged with heavy rains above their carrying capacity, the water rises in the inlets and is backed-up in house-drains to the great inconvenience of the householders. The lower parts of London have been much afflicted in this way during the unusual rain-falls of the past two years.

The great intercepting-sewers recently constructed along the banks of the Thames are proportioned so as to carry off, besides the expected flow of sewage, a rain-fall of one-quarter of an inch in 24 hours from their water-shed. Many of the tributary sewers receive and bring in a good deal more than this, but provision is supposed to be made for the overflow of this surplus into the river. Whether the evil is to be attributed to an inadequate provision for this overflow, or to inadequate capacity in the branch sewers, we are not fully informed; but it is certain that much inconvenience has arisen in the lower part of London which has been newly built upon within a few years. I copy the following from the London *Engineering*, of January 16, 1880. "A comparatively new danger to health in the metropolis occurred during 1878 and 1879. In some districts, owing to the heavy rain-fall, houses were flooded from the sewers during almost every heavy storm. Consequent upon this the cellars, kitchens, and down-stairs sitting-rooms were as often coated with solid matter of the sewage in hundreds of houses, both north and south of the Thames. Although this was in part due to excess of rain, still the chief cause was that the existing sewers were much too small to carry off the refuse from the great number of new houses that are annually added to London. These may be reckoned by miles in length additional for each year. At last the evil became so great that the Metropolitan Board was compelled to take up the matter. New sewers are in course of construction which will for the present alleviate the evil. But these temporary measures, of course, will only act as a palliative, and it requires no great amount of foresight to perceive that ere long the whole sewerage system of the metropolis will have to be reconstructed."

This is an editorial in a journal which is not given to sensational articles, still I doubt if Mr. Bazalgette, the engineer of the Metropolitan Board, would agree to the idea expressed in the last paragraph.

The quantity of surface-water that will naturally run into the sewers during a given time, after a heavy rain, varies largely according to the circumstances. The following considerations all affect the rapidity with which rain-water will drain upon the surface: viz., the character of the surface as to improvement by building and pavement; *e. g.*, a city with few open spaces has most of its surface paved or roofed; under such conditions, some 80% or 90% of the actual rain-fall will get into the sewers within twenty-four hours. But just in proportion as the surface is covered with gardens or grass-plots, the drainage will be delayed. So that in many suburban towns less than 50% will drain off in winter, and less than 20% in some short summer rains when the ground is warm and the evaporation rapid. The character of the slope affects this question also. The sides of hills drain much more rapidly than plains. So that the engineer must take all these questions into account in providing for the surface-water. Local acquaintance is often of great service in determining such questions, where the judgment and experience of a man goes farther than any possible computation in arriving at a proper conclusion. If the steep, sloping side of a hill is bounded at its base by a district nearly level, the water will drain from the slope with great rapidity, and will be likely to overtax the sewers on the plain in sudden bursts of rain, if special pains be not taken to prevent such a result. Where the hill district is not large enough to warrant the construction of an intercepting-sewer to keep its drainage out of the plain, it is sometimes feasible to relieve the sewers at the base of the slope by overflows into natural water-courses by special short conduits. But where the flow from the slope must be carried for any considerable distance by the sewers on the plain, the latter will need to be constructed quite large, to avoid being overtaxed on such occasions. We sometimes have a large quantity of rain in a few hours. Published records of rain-fall in New England show that we often have a fall of over an inch per hour for an hour or more. It is better, if possible, to guard against such emergencies by ample overflows, than to increase the size of the long sewers in a plain, provided the opportunity is found to discharge the water into streams. For the increase of size in such long sewers would be seldom needed, requiring a large outlay of capital for rare occasions, and a sewer less likely to keep itself clear by scour at all other times.

The rules practised in different cities in the same climate and inhabited by a people of similar habits are found to differ quite widely in regard to the quantity of rain-fall provided for within a given time. In Boston, where the population is quite dense, and very few open squares with grass-plots exist, and where in the older part of the town the surface is hilly, the drainage necessarily follows short lines of streets, radiating from the hill-tops and discharging under the old system, by a large number of outfalls, into the surrounding tide-water. In many of these lines of sewers the fall is quite rapid, and the surfaces which feed the sewers are steep and mostly covered with buildings and pavements. Here it has been the practice to provide for one inch of rain-fall per hour getting into the branch sewers, and even with this ample allowance some localities at the foot of the hills (such as Dock Square) have been flooded during violent rain-storms. The new intercepting-sewer, which is now being constructed to receive all these short branches, will be expected to carry only a rain-fall of one-quarter of an inch, or less, per hour, on the surface drained by it. The difference is in part because of the greater steepness of the area feeding the branch sewers causing a rapid drainage, and in part from the relief by overflows by which a large portion of the water may be gotten rid of before it enters the intercepting sewer during violent storms. Moreover, the farther the water flows from its gathering-ground, the more is a short and sudden burst of rain diffused over the length of the system, making less show the farther it runs; just as freshets which occur near the source of a river appear at first in a large rise over a short distance, but, in passing down some hundreds of miles, the rise is much less in height, but perceptible over a longer district than at first.

In proportioning the sizes of sewers for a desired capacity of discharge, and an inclination fixed, as it generally will be, by the local topography, the tabulated results of various authors are found based upon formulæ where the coefficients of friction have been deduced from their experiments. But as the smoothness of the surface and the uniformity and shape of the conduit affect the velocity of flow very considerably, regard must be had to these disturbing elements, either by eliminating their existence or by making due allowance for them in the computations. The fullest and most recent sets of tables that have been published on the discharge of sewers are to be found in the works of Baldwin Latham. But in all cases where sewers of any considerable size are to be provided for, experiments with the precise conditions of the problem, where possible, form a much better reliance than any printed tables. The formulæ published by different authorities differ only in the value of the coefficients and the care with which the circumstances of the case are foreseen and met.

The following are some of the formulæ used by the best authorities: —

Chezy's formula: —

$$\text{(General form, } V = \sqrt{2\,g\,h}\text{).}$$

$$V = B\sqrt{rs}$$

where B is to be determined by experiment.

$r = \frac{a}{p} = h\,m\,D$ (or "hydraulic mean depth") $\begin{cases} a = \text{area.} \\ p = \text{wet perimeter.} \end{cases}$

$s = \frac{h}{l} = \frac{\text{height}}{\text{length}} = \text{sine of slope.}$

By Beardman, $B = 94.2$.
By D'Aubisson, $B = 95.6$ over $V = 2$.
By Eytelwein, $B = 93.4$.

[1] A lecture by Mr. Edward S. Philbrick, C. E., delivered before the students of the Massachusetts Institute of Technology.

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Weisbach's formula: — $V = \frac{\sqrt{2gh}}{\sqrt{1 + e + c \times \frac{l}{d}}}$.

c = coefficient for friction, depending on material, and also varying with velocity.

e = coefficient for entrance, depending on form of end of pipe, and therefore inconsiderable in long pipes or conduits.

d = diameter of pipe and l = length of pipe.

DISPOSAL OF EXCRETA, FLUID AND SOLID.

We have touched in a general way upon the importance of the immediate removal of the excreta of our bodies. We have also considered, more in detail, the methods of removal of the volatile excreta of the lungs and skin by ventilation. It remains to consider the removal of the solid and fluid excreta thrown off by the bowels and kidneys. The method in which this may best be done must vary somewhat in different climates, soils and habits of life. What we have to do with chiefly is our own climate and the habits now existing in our own community, wherever the population is gathered in towns or cities. This is one of the most vexatious problems with which the sanitarian has to deal, for the reasons that the same methods which may succeed in one locality are found to fail in another, and because there have been various rival schemes before the public, promoted by parties who sought to get a profit from the operation, and who naturally looked upon the question with more or less bias in favor of their own methods, to the exclusion of all others.

There has been a great effort made, particularly in England, to utilize human excreta by various chemical processes. These all endeavor to separate the solids from the fluids and to leave the water in a condition sufficiently pure to avoid its being a nuisance when discharged into running streams. Up to a certain point all parties agree, viz., that the organic refuse, when separated from the water of sewage, should be devoted to fertilizing the soil, and therefore all aim at the production of a commercial manure, which it may be for the profit of the farmer to buy and apply to his crops. They would thus be acting in unison with that endless cycle of physical change, before alluded to, where all decay in animal life forms the food of plants, these plants again forming the food of animals. The difference of opinion arose as to the method of treatment, but if the prospect of profit by the sale of the product to the farmer were given up, the only motive remaining, that of disposing of these matters for the best advantage of the whole community, would combine the various conflicting opinions, so far as they happen to be adapted to the circumstances of the case to be treated. So far as our present experience goes, this question of possible profit by sale of the product seems to be settled in the negative. It remains then for each community to employ such method as is found to be most consistent with its peculiar circumstances.

The various plans for removal are generally divided into two general classes, the "water-carriage" and the "dry" system.

Our own countrymen have seized upon the water-carriage system with great unanimity, and in many cases perhaps without proper consideration of the conditions which are essential to its success, viz., a copious water-supply, and a system of sewers adapted to the purpose, with an opportunity to discharge the contents of such sewers without becoming a nuisance to themselves or to others. In all towns which have the means to provide a water-supply and to construct sewers, and a proper place to discharge them, consistent with the welfare of others, there is no question but that the system of water-carriage has merits that will put all dry methods quite out of the field. It is with regard to such places as do not possess such means or opportunities that the methods of dry removal deserve attention.

It is universally agreed that any plan is bad which involves the *retention* of excreta in or about a house for more than twenty-four hours at most. Immediate and regular removal is of the first importance. On this account nothing can be much worse than the privy-vault, especially if connected with the house by continuous roofs. The gases evolved by the decomposition of the contents of such vaults or cess-pits pervade the whole house by diffusion, so that no quantity of disinfectant or deodorizer which can be applied to such cases can afford anything more than temporary relief. Unfortunately this system is still very largely in use not only in country villages and isolated houses, but in our old towns and cities as well, especially among the poorer class of dwellings, where the owners have not felt able to make the expenditures necessary for adopting the method of water-carriage.

The methods for emptying vaults, and removing their contents, have been very much improved of late. In place of the offensive wagons, with their furniture covered with filth, which formerly filed out from our city over all the leading thoroughfares every night, we have now compact tanks on wheels, kept perfectly clean outside, and filled by means of pumps and hose which accompany them.

Estimates at the office of the Board of Health rate the number of vaults still in use within this city [Boston, Mass.], at about thirty thousand, of which two-thirds, say twenty thousand, are closed vaults, having no connection with the sewer. There are from five thousand to seven thousand of these cleaned out annually,—indicating that they average about three years without cleaning. Since some are cleaned every year and even oftener, it follows that some are allowed to remain much longer than three years without cleaning. It is now over thirty-one years since the city has had an abundant water-supply, with which the use of water-closets became practicable. This large use of the vaults up to the present day serves as an example of the slow rate of change in customs of this kind, and how much remains to be done to bring our own community up to the standard which we recognize to be the only proper one.

Those communities whose topography and surroundings do not favor the disposal of excreta by water-carriage and sewers must have recourse to some of the dry methods. These can be used to better advantage in small compact communities like prisons, schools, and other public institutions, where supervision can be safely depended upon. In such places these methods have given satisfactory results where carefully developed and administered, and they will doubtless continue to be so used. Several systems of removal without water are described in detail in the Seventh Annual Report of the Massachusetts Board of Health. But as their use in our country is likely to be very limited, I shall content myself with this reference without any further description. Among the best of these methods is that known as the dry-earth system, with the earth-closet in place of the old privy. Dry loam is used to mix with every alvine discharge at once. It has the effect to deodorize fecal matter, and absorb the gases of its decomposition. It is well adapted for private houses of the better class in the country, where the owners cannot afford the cost of the water-closet system with its attendant conditions of water-supply and sewers. But the earth-closet, like all other methods of dry removal, is dependent for its success upon the vigilant care of those who have it in charge. Any remissness on their part is fatal, and the devices which appear so satisfactory when carefully managed, become terrible nuisances inside of a house, if the least neglect is allowed. The difficulty that would arise in furnishing the necessary quantity of dry earth and in removing that which had been saturated, when applied to large communities, has prevented, hitherto, the application of the earth-closet system to any whole towns or cities. The removal of excreta from cities in any way except by water involves a great deal of labor and cost. The quantity voided per thousand of mixed population is estimated at one and one-quarter tons per day. This would amount to upwards of three hundred tons daily for the city of Boston alone. If this were all to be removed by the earth-closet system, an equal amount of earth, say three hundred tons, must be brought in from the country in a dry state every day, and the whole with the excreta, amounting to six hundred tons in all, removed daily from the city's limits. The cost of such a system, properly supervised and inspected, would thus be very onerous, while the difficulties arising in carrying out the detail of distribution and collection in a satisfactory manner would be practically insurmountable. In considering the collection of excreta by water-carriage a wide and important branch of the question is opened, viz., — the drainage of towns.

ROBINSON ON SEWAGE DISPOSAL.[1]

The question of the disposal of sewage has now for some years given much trouble to the engineering world; a great number of conflicting theories have been propounded, and processes have been tried, and a considerable amount of literature has been devoted to advocating the various processes and theories, among which the careful engineer was obliged to pick his way with considerable caution. Now, however, the period of enthusiasm is past; the inventions which seemed to promise valuable results have been thoroughly tried, generally with the result that unexpected difficulties have nearly counterbalanced the advantages gained, and the elimination of impracticable systems, with actual experience of the more rational ones, has progressed so far that it is possible to give in a small compass a *résumé* of all the important modes of waste-disposal which experience has approved, with a reliable statement of the conditions necessary for their successful adoption, and the results to be expected from them. Such a *résumé* Mr. Robinson has undertaken to furnish, and although the expert may perhaps note a few omissions, and possibly some unintentional want of even justice to all the processes, his book is still of much value, as comprehending all that most persons not engineers need wish to learn of the present state of knowledge concerning a matter of great and growing importance; while professional men will find in it, in addition to the brief accounts of the various systems, with which they are already familiar through the works of their several advocates, exact and tabulated statements, giving the results of various trials to the present time, from which they can draw their own conclusions regarding the merits or demerits of each.

The author states his own general conclusion in a few words of the preface. "Where suitable land is available," he says, "I advise irrigation; but where such is not the case, I employ chemical treatment," *i. e.*, precipitation. Judging from the facts which he brings forward in the course of the book, his conclusion is well founded.

Some preliminary remarks on house sanitation form the introduction, all brief, and for the English climate, judicious. The vexed question, whether house soil-pipes should be used for sewer ventilation, meets with a decided negative. "House-drains," says Mr. Robinson, "should be effectually trapped from the main sewer."

The first mode of waste disposal taken up is irrigation, and some new and interesting facts are cited. Contrary to the common notion, it appears that the irrigation of soil with sewage does not enrich the soil itself. It increases the growth of the plants which happen to be there, but the matter which is not at once absorbed by their roots is completely lost in the subsoil. The famous Craigentinny meadows

[1] Sewage Disposal. By Henry Robinson. London and New York: E. & F. N. Spon, 1880. Price $1.50. Received by A. Williams & Co., Boston.

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near Edinburgh are cited in support of this. After having been irrigated with sewage for many years, bearing enormous crops all the time, analysis shows that the composition of the soil has not changed in the least. Before irrigation began, it was a sandy ground, containing one and one-half per cent of organic matter, — root-fibres, — and it is the same now. Whatever may be the nature of the assimilative process, the great fertility of sewage-irrigated lands is well proved. Some statistics from the sewage farms of Gennevilliers and Asnières, show the effect upon sandy soils. Comparing the crops on sewaged and non-sewaged territory, it is found that the average yield of rye on the former is 166 hundredweight to the acre, to 52 on the latter; potatoes yield on the irrigated lands 742 bushels, to 453 on the non-irrigated; while in rye-grass, the staple sewage crop, the irrigated fields produced 1,023 hundredweight to the acre, while those not treated average but 108. Mr. Robinson quotes Mr. William Crookes as disparaging the quality of the Gennevilliers vegetables, saying that if the rye-grass were broken the juice would have a decided smell of sewage; but Mr. Crookes appears in another place as president of a precipitation company, so his judgment may have been warped, and similar statements have been repeatedly shown to be groundless.

The various processes still in use for purifying sewage by chemical separation of the organic matter are next considered. The author's opinion, for which he gives good reasons, is on the whole in favor of precipitation by alum, especially if the alum contains iron salts, which much assist its action, and he gives statistics of the results obtained at Coventry by the "A B C" process, in which alum, blood, clay and charcoal are employed, the precipitate forming a manure of some value. Next comes a "caution" to those who think that discharge into the sea is the best disposition for the waste of coast towns, and this ends the list of methods for sewage disposal treated of. The author claims that in a great many, if not the majority of seashore towns, the necessary conditions for safely discharging sewage into the ocean do not exist. One of these conditions is that there shall be at the outfall a continuous motion seaward during the twenty-four hours, instead of an oscillative action to and fro, which will result in the return of the sewage and its deposition along the shore. Sea-water, it is said, delays the oxidation of organic matters, so that foul matters which in river-water would be soon got rid of, are, when poured into the sea, preserved much longer; and it is also asserted that matters suspended in fresh water are deposited, by a kind of chemical action, when even a small quantity of saline solution is added to the water; To this is attributed the formation of the foul mud-banks which almost obstruct the Thames near the outfalls of the London sewers.

MATHEMATICAL DRAWING INSTRUMENTS.[1]

A SIMPLE glance at the table of contents of this work is sufficient to indicate that it was written by one who has been engaged in teaching mechanical drawing to classes of boys. The average boy when he first approaches the drawing-table is a very awkward and clumsy creature, and by frequent association with boys in the class-room the author has evidently convinced himself that it is impossible to be too minute in describing the construction and use of the tools with which they are to work. Even admitting this, we are somewhat astonished to find that one hundred and fifty-two pages are required to describe these few tools; and after reading the work carefully, we think it would have accomplished its proposed object better if it had been reduced one-half. In reading the notes and queries in some of the popular scientific serials, we are often struck with the singular questions asked, implying in many cases almost a want of common sense on the part of the questioner, and perhaps our author set himself the task of answering all such questions beforehand in the matter of drawing-instruments. To make perfectly clear what we wish to say, we should pronounce it a suitable book for a primary school, so far as minuteness of explanation goes, but not to be unreservedly recommended even for that class. When a boy has grown old enough to go to the drawing-table, — and we have such faith in drawing as a means of instruction that we should be glad to see this exercise commenced at a quite early age, — he would learn more in a few hours of practice than he can possibly learn from this book.

The weakest point of the book is its geometry. Here the reader is sometimes tempted to question the writer's acquaintance with the subject, or even his familiarity with common geometrical terms. For instance, the word *chord* does not appear, and one would be led to infer that the side of a regular polygon was the aliquot part of the circumference of the circumscribed circle. Thus, on page 74, we read: "The beginner will soon find, too, that the radius of a circle will go just six times round its circumference. Mathematically, the ratio of one to the other is not exactly one-sixth, but the difference is so slight that for all practical purposes it is non-existent." Again, on page 110: "It will be remembered that the radius of a circle goes six times round its circumference," etc. It is true that the chord or side of the hexagon differs from the sixth part of the circumference by less than five per cent, but is this the way to present it to a novice? The worst case, however, occurs in the test of triangles, or "set-squares." The geometrical construction here given introduces so many sources of error that we should be inclined to test the geometrical construction by the instrument, instead of testing the instrument by the geometrical construction. In general, the remarks, suggestions, and cautions have a true foundation, and for primary classes they are admirable; but those are precisely the classes which cannot appreciate their full significance, and which need a practical instructor. It may suit the wants of a very limited class of uneducated mechanics' apprentices — the class which is constantly asking, "How can I learn drawing without a master?" Unfortunately it does not teach even this class how to make a drawing, but only tells them something about their tools.

[1] Mathematical Drawing Instruments, and How to Use Them. By F. Edward Hulme, F. L. S., F. S. A., Art-Master of Marlborough College. New York: Bicknell & Comstock. 1880.

A BUILDING SAFE-GUIDE.[2]

"THIS treatise, which is based on practice, is accompanied with the necessary plates [two, containing seventeen cuts in all] and tables. . . . .

"All the statements and figures contained therein are warranted to be correct, as a great many mechanics and others are ready to rise and swear to them: therefore do I set at defiance all adversaries who may be disposed at any time to make serious objections to this work."

In this style the author addresses his readers in his preface, and warns the critic to approach his task with becoming caution, so that if he feel disposed to make "serious objection" to any statement found in this book he will do well to qualify his criticism by saying in the language of Artemus Ward, "This is a joak." Moreover, if the critic would escape the ban of "society at large," he must guard himself against seeming hostile to the book, for the author elsewhere says: "Therefore do I claim that the enemies of this work are strongly opposed to the interests of society at large."

Others of the architect-author's utterances are, to say the least, novel, as for instance the statement made as an argument against having competitions for private buildings, in this language: "No architect can build cheaper than another, if both of them know their profession well, and intend to deal fairly, consequently there cannot be much material difference between designs of this class."

The author has divided his work into three unequal parts, the first of which is most depressing as it deals with the many possibilities of defrauding the owner that arise in building operations, particular stress being laid on the opportunity to make unlawful gain by collusion between the architect and builder, when the architect accepts inferior work and material, and shares the builder's profit. This would be a very uncomfortable idea to entertain could not one take refuge in the comforting thought that as yet no one has seen fit to throw a light on the illegal gains which the physician shares with the druggist, when he wittingly prescribes for his patient, as helpless in his hands as is the ordinary client in the hands of the architect, a needless quantity of adulterated drugs.

The second part is more cheering, for here we find vaunted the merits of a "new system" of conducting business which is to preclude every chance of fraud. To be sure, it is a little disappointing to find that this new system does not vary materially from the practice of architects in good standing in the East, and it is hard to see how it can be new to the same class of practitioners in the West. Of the sixteen clauses of the synopsis of the new system, there are some whose value we do not appreciate: for instance, why it should be necessary for all competing mechanics to sign the drawings and specifications; or what is to be gained by attaching the contract price, after that has been determined, to the specifications. As the apparent purpose of the work is to inculcate suspicion, it is not surprising to find that under the new system the owner, not the architect, is to receive and open all bids from mechanics.

The third part which occupies about three-quarters of the work is given to a treatise on materials and workmanship, which may or may not be useful, according as the reader's previous knowledge of the things treated is sound or unsound. Much of the information is trite, some of it is misleading, and some of it is absolutely wrong and harmful. But the author evidently considers that its saving grace lies in the fact that "it exposes and explains also in detail all the frauds which may be perpetrated in each trade, and shows all possible ways and means to detect them." But even in the special field the author has undertaken to exploit, we find the work but imperfectly done, for we find it said that cast-iron soil-pipes — which, by the way, are said to vary between four inches and fifteen inches in diameter — of the same diameter "are of the same strength or thickness of metal" so that frauds can be effected only by using smaller sizes than are called for. Evidently, then, the writer knows nothing of sand-holes, cracks, and pipes thinner on one side than the other.

We regret to see amongst other errors of judgemnt, that the writer recommends the Kyan method of preserving timber by the use of corrosive sublimate, and amongst errors of fact the statement that "the connections of water-closets are made with the best glazier's putty." It is disagreeable to be forced to put one's self under the ban of society, but as we are persuaded that the author has been as ill-advised in publishing his Building Safe-Guide, as he has been unhappy in his choice of a title, we are bound to say so, and we find that we cannot palliate our offence in his eyes by closing with the words of the great American humorist.

[2] Marcotte's Building Safe-Guide. By Charles Marcotte, Architect, St. Louis, Mo.: Slawson & Pierrot, Printers. 1880. Price $1.00.

THE CHOICE OF A BUILDING-SITE.

A CELLAR is a desirable thing — handy to have in the house — if properly made; but a poor cellar, one badly ventilated and drained,

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is worse than no cellar. Better be without it altogether than not have it as it should be; better stand the house on piers, and let the winds of Heaven have free circulation under it, than make of it a plague-spot, which it will be if the cellar is sunk in wet and spongy land, or if filled in winter with decaying vegetables. In many parts of Europe the cellar is used as a stable, and I have there frequently passed a night at a time, though not without trepidation, over a cellar so occupied, while the attic was given over to hens. It is gratifying to think that we are not likely to come to this in our own country; but we are still far from thoughtful about our cellars. No man should think of building on soft and spongy land, nor in a locality where the soil is inclined to hold water; and it is even more objectionable to select a site on made land, for the filling-in is too often composed of refuse matter, collected wherever it could be found, and in which there is more or less of decaying animal and vegetable waste. Of late years we have been waking up to the fact that these laws are sound and should be rigidly enforced. But they are not new: in fact, they are almost as old as the hills. Of this I have been reminded by recently reading a review of the works of Mānasāra, the Vitruvius of India, in the London *Building News*.

The time when Mānasāra lived is not known: suffice that his notes for the guidance of architects and builders ante-date the writings of some of the learned sages who compiled the sacred books of India. That he understood the laws of sanitation, is clearly shown in many of his instructions. At the outset he tells his readers what should be the qualities of the soil on which to build, if one would have a healthy house, and how to test the soil to ascertain its qualities. "Habitable ground," says the sage, "may be known from its color, smell, taste, form and touch. The best sort of ground should abound with milky trees, full of fruit and flowers;" but a spot that is slimy, damp, subject to unwholesome effluvia, near a burying-ground, or any other repository of decayed matter, should be avoided on every account. One of the tests, to ascertain if a site selected is a suitable one to build upon, is, to dig a hole, and after having made the excavation, fill it up with the earth that has been thrown out. If after filling the hole there should be a surplus of earth, it is a sign that the ground is good. If the earth barely fills the hole, the ground is but indifferent; but if the earth so thrown out is not enough to fill the hole, have nothing to do with the location, for it is positively bad. These last instructions, cited by the *Building News*, are from the *Matsya purana*, which dates from the same early period.

A good dry site, on firm upland, is not only the most suitable on sanitary grounds, but also for many other reasons. A house always appears to better advantage, if, when we approach it, we have to look up to it. To press a house down to near the level of the ground is to injure the effect it would otherwise produce, and it also shuts it off from light and air.

Whether we give much thought and attention to other parts of our dwellings, we should see that the cellar is not only well drained, but also that it is ventilated, and has its bottom covered with concrete. Different soils require different treatments: a sandy soil must be handled in one way, and a tenacious clay in another; but whatever the soil, we must always come back to the one point, — that a cellar must be light, airy and dry, to make it safe for one to dwell over it.

Bedrooms in the cellar, or, as we sometimes call it, the basement, are unhealthy, and too often are really dangerous, even in houses that are built on a sandy soil, and with the basement well out of ground. In our climate, and particularly in New England, there is much humidity in the atmosphere, and the changes in the temperature are often great and sudden. At such times the condensation is rapid, and in a cellar everything soon becomes surcharged with moisture; the air becomes fixed, or, at best, sluggish, and the opening of the windows does not correct the evil; on the contrary, the difference in temperature invites the moisture-laden air to enter and deposit its load, and thus, while the cellar was apparently dry and free from moisture during the winter, when it was shut up, the summer sees drops hanging from the ceiling and running down the walls. If the occupants of basements, those who work in them by day, and sleep in them at night, could or would, with watchful care, open the windows during the dryest part of the day, and close them promptly at the least indication of a change of temperature, the evil might in part be overcome. But in so doing we should rob them of air, — suffocate them by enclosing them, as it were, in a wet blanket, — and so we leave them to attacks of rheumatism, or, worse still, some fatal form of lung-disease. There is very little poetry in a cellar, and I do not think any one can call to mind any rhapsody on the subject. Even Mantilini felt the depressing influence of the cellar, in which, in his latter days, he turned the mangle. No one who ever lived in a cellar was jocose. A garret might do. Poets have lived in a garret, and have successfully courted the Muse under the rafters that gave them shelter; but a cellar — nothing in this day can be said in its favor.

Champlin.

THE ILLUSTRATIONS.

MANTEL-PIECE AND FURNITURE. MESSRS. LINDSLEY & CUTTER, ARCHITECTS, NEW YORK, N. Y.

The chimney-piece is of dark marble, and the dado and clock of ebonized cherry and maple; the lambrequin is embroidered in subdued tones of color. The dado is divided into three panels; the middle one is filled with one of Alma Tadema's etchings, The Roman Emperor; the end panels are filled in with polished brass sconces on etched brass plate and embossed gold leather. The clock-face is of polished brass, hands silver, figures black; the lower door is filled in with leaded glass, colored and transparent, so that the large polished brass pendulum may be seen. On the clock under the shelf is the inscription, "Time and tide wait for no man." The chandelier is made of polished brass; the globe is made of leaded glass, colored and transparent, lead gilt. Inside the globe are two small burners; the argand burner at base slides up and down, to be used as a reading-lamp. The picture-frame is made of ebonized cherry, with a Japanese figure painted on fine gauze. The furniture is all covered with embroidered material. The dimensions of the bric-à-brac case are about eight feet six inches high by five feet six inches long and two feet six inches wide. It is made of ebonized cherry, moulded, carved and painted, mounted with polished brass. The curtains are hand-worked in crewels in several colors.

DESIGN FOR A CITY HOUSE. MR. W. A. BATES, ARCHITECT, NEW YORK, N. Y.

UNITED STATES POST-OFFICE AND COURT-HOUSE, KANSAS CITY, MO. MR. J. G. HILL, SUPERVISING ARCHITECT OF THE TREASURY DEPARTMENT, WASHINGTON, D. C.

COUNTRY HOUSE. MR. A. M. WEST, ARCHITECT, WATERBURY, CONN.

BALMAIN'S LUMINOUS PAINT.[1]

Every one knows that a ray of white light consists of minute waves, or ripples, analogous to those of water, and of various lengths. The mean length of these waves, measured from the crest of one to the crest of the next, may be taken as the fifty-thousandth of an inch. They all travel in straight lines, and all with the same velocity, a velocity which is called the velocity of light. In passing through a prism, these lines of waves are refracted, or bent at different angles, and when afterwards allowed to fall on a screen, they are reflected back to our eyes, and a portion of them, acting on the optic nerve, produce the sensation of color. These rays are, therefore, called the visible rays. Here on the screen you see the spectrum of the white electric light.

The eye is, however, a very imperfect optical instrument, and is only sensitive to waves between certain limits of length. The real spectrum on the screen is much larger than the visible one. There is a portion beyond the red, which is called the ultra-red portion. The waves of this portion are too long to affect the eye, but are powerful in producing the phenomena of heat. The rays are, therefore, sometimes called the invisible or obscure heat-rays. There is also a portion beyond the violet, produced by waves too short to affect the eye, but active in producing chemical and other effects. These rays are called the ultra-violet, actinic, or chemical rays.

Many years ago, Sir John Herschel observed the peculiar blue opalescence which a solution of quinine presents when held in certain lights. Brewster made further observations of the same kind; but it was not until 1852 that Professor Stokes, of Cambridge, published the memorable research on the subject, which would alone have been sufficient to render his name immortal in the history of science. Stokes suggested the name, fluorescence, for the phenomenon, and showed that it was due to a power, which some bodies possess, of absorbing light-waves, and emitting them again as longer waves. Quinine is peculiarly sensitive to violet and ultra-violet rays. If I pass a solution of quinine through the spectrum, beginning at the red end, you will see that the fluorescence does not appear until we reach the blue portion, but continues to be visible far beyond the violet. In the ultra-violet portion, we have a distinct conversion of invisible actinic into visible light rays. Here is a solution of the new Magdala red, made from naphthaline. It appears black in all parts of the spectrum, except the region of the yellow, in which it shows a magnificent red fluorescence. This experiment proves that fluorescence is not always caused by the conversion of invisible into visible waves. We now throw a beam of electric light, filtered to some extent from heat-rays by passing through ammonio-sulphate of copper, on two jars of water, and throw into one a solution of quinine, and into the other an alkaline solution of the curious compound called fluorescine. You perceive in the one case a blue and in the other an intense emerald-green fluorescence, and it is really difficult to believe that in each case the solution remains transparent. In fluorescence, then, we have generally, if not always, an increase of wave length, due to the molecular action of certain substances. The waves are never shortened, and are sometimes described as suffering "degradation." The luminosity ceases as soon as the incident light is withdrawn, or, to speak more cautiously, it lasts only for a minute period of time afterwards. In the case of quinine, the work of converting invisible into visible rays seems to take about the 5,000th part of a second.

We come now to a closely allied, if not identical, phenomenon. Many substances are known which, having been exposed to light, continue to emit light for measurable periods of time after the luminous source is removed. This phenomenon is called phosphorescence, and it is with this that we are chiefly concerned to-night. The term phosphorescence has been applied to light emitted under various conditions. Thus we have the light emitted during the slow oxidation of phosphorus; the light of living animals, such as the glow-worm and

[1] A Paper read before the Society of Arts, London, by Mr. C. W. Heaton, F. C. S.

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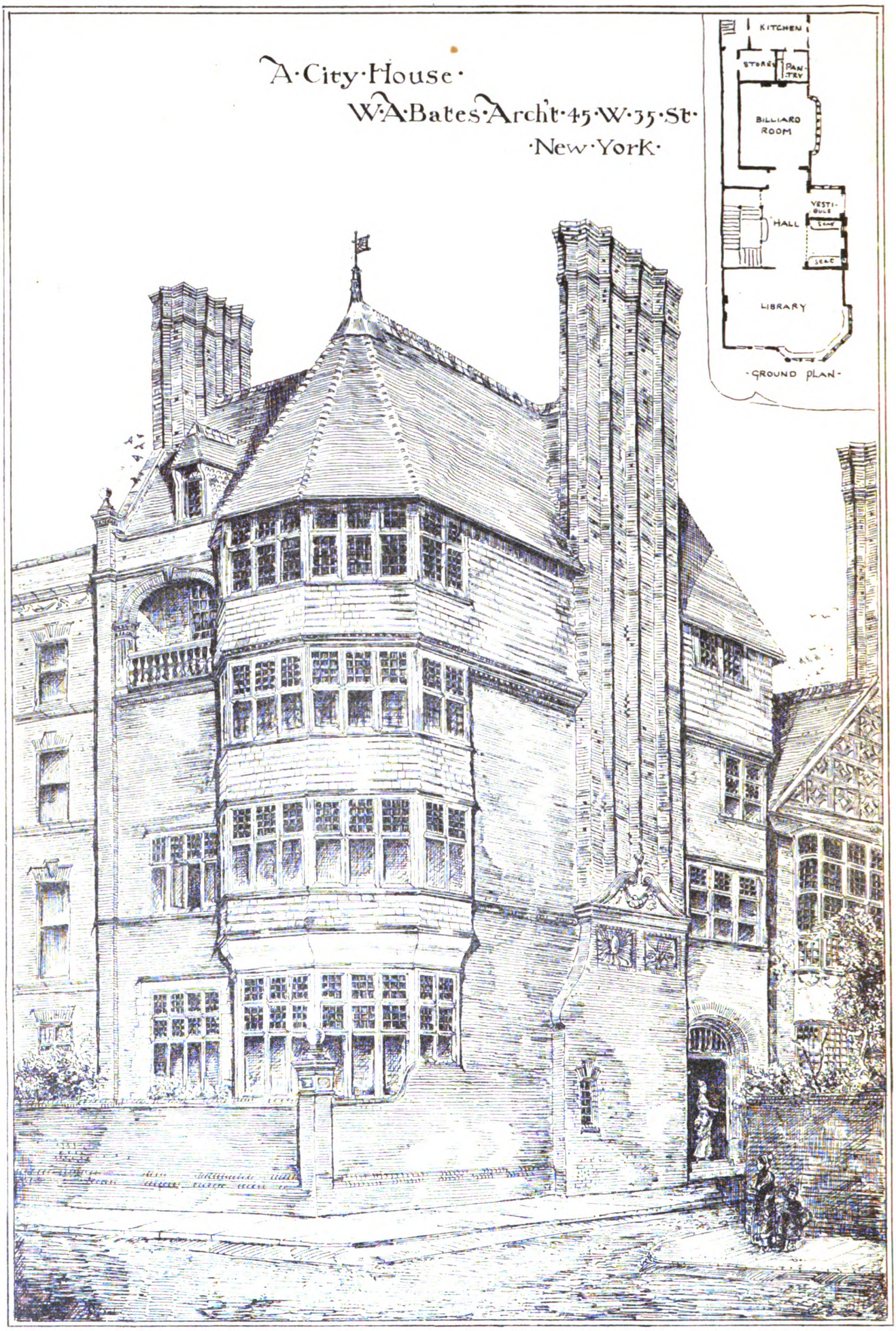
A City House.

W. A. Bates, Arch't, 45 W. 35 St.

New York.



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AMERICAN ARCHITECT AND BUILDING NEWS. MAY 15, 1880.

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PLAN.

PROPOSED HOUSE AT WATERBURY CT. A. M. WEST ARCH'T.

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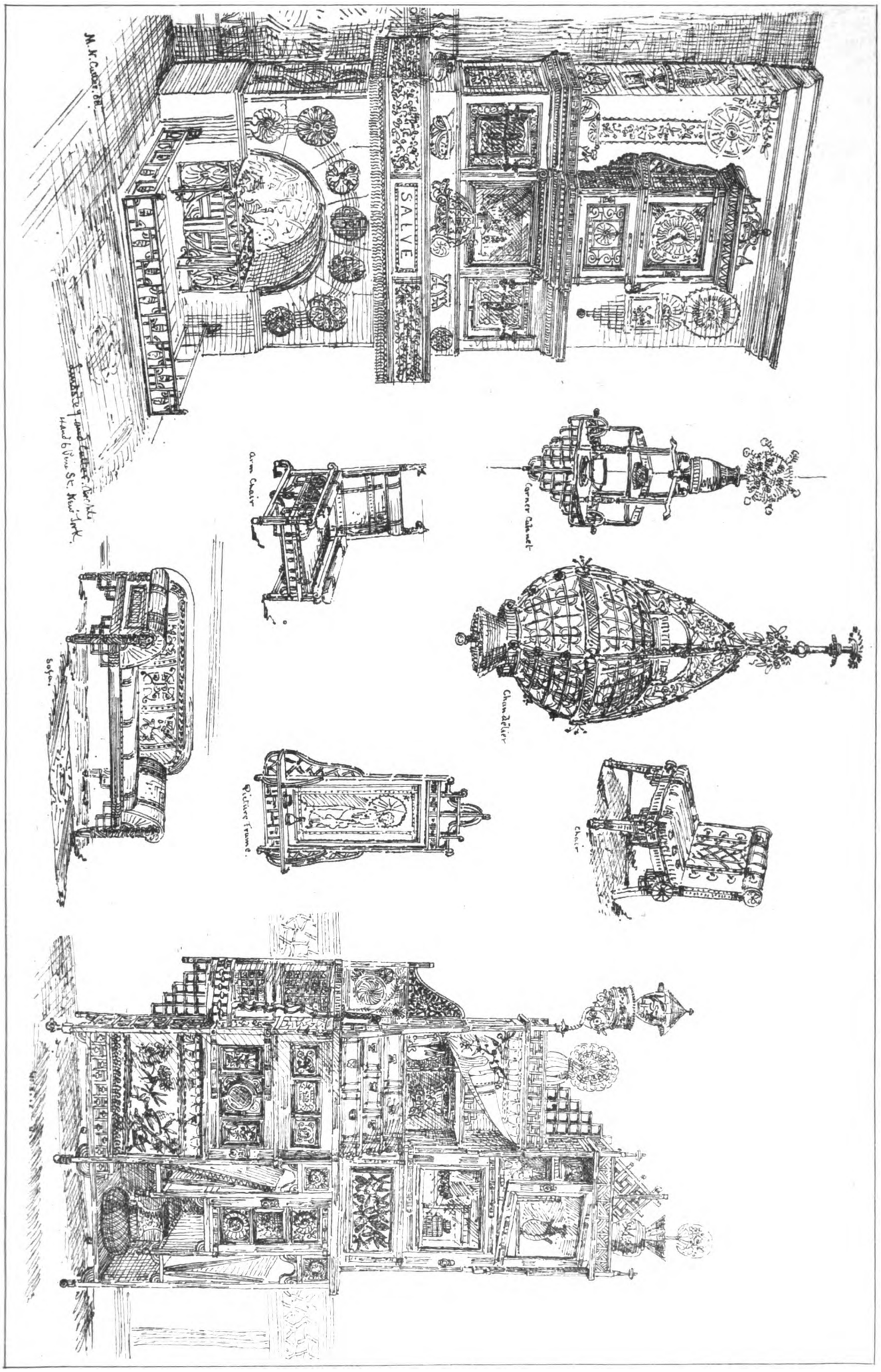

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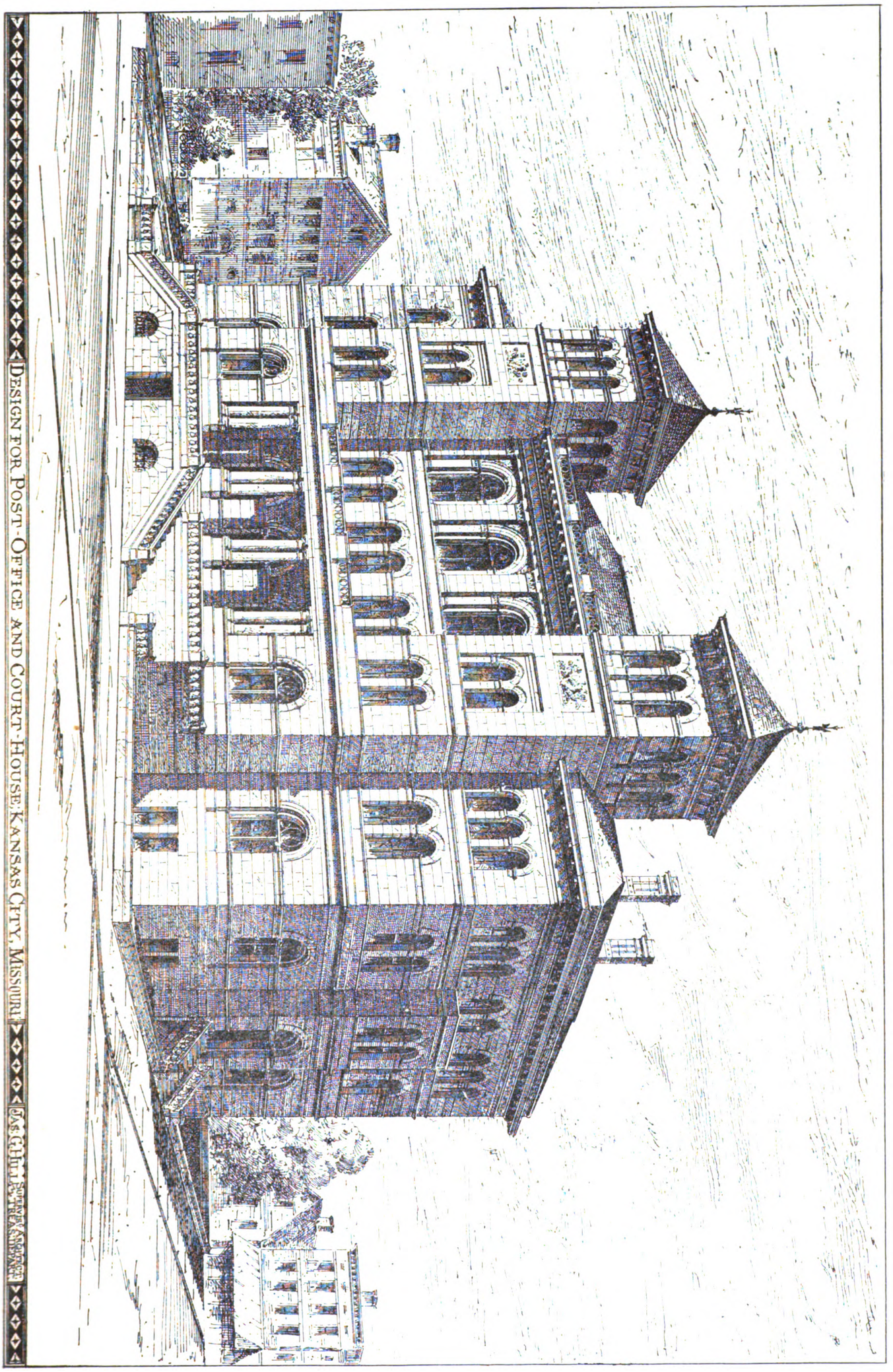

DESIGN FOR POST-OFFICE AND COURT-HOUSE, KANSAS CITY, MISSOURI.

JAS. GILL, SUPERVISING ARCHITECT.

THE HELIOTYPE PRINTING CO. 128 PEARL ST. BOSTON.

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the noctiluca; the light attendant upon incipient putrefaction, animal and vegetable; the light produced by the heating of phosphorus, and many other bodies; by percussion, as when sugar is struck with a hammer or rubbed, and the beautiful phenomena developed in high vacua in that strange condition of matter with which Mr. Crookes's remarkable discoveries have lately made us familiar; and, lastly, we have the light which follows insolation. All these are grouped together under the general term phosphorescence, but it is with the last one that we have at present to deal.

The history of discovery in regard to this kind of phosphorescence is a somewhat lengthy one. Obscure hints of the phosphorescent power of gems are contained in some of the works of the ancients, but nothing definite was discovered until about the year 1602, when a shoemaker of Bologna, named Vincenzo Casciorolo, picked up a heavy stone, and, being an enthusiastic alchemist, took it home and treated it in his furnace, in the hope of obtaining gold from it. Instead of getting gold, he obtained a mass which shone in the dark, and which became celebrated as the Bologna stone, or Bologna phosphorus. The stone was the now well-known heavy spar, and acted on by carbon it yielded barium sulphide, a compound of considerable phosphorescent power. In 1663, Boyle published some observations on the phosphorescence of the diamond, and, in 1675, Baudoin obtained another phosphorus by the action of heat on calcium nitrate. Some important additions to our knowledge were made by Beccaria, in 1744, and then came the discovery by Canton, in 1761, of the phosphorus or pyrophorus which bears his name. It is made by calcining oyster-shells with sulphur, and consists of course essentially of calcium sulphide, which is the most remarkable of phosphorescent substances. Thanks to the kindness of my friend, Professor Tuson, I am able to show you a sealed tube containing a specimen of this substance prepared by Canton himself, with the date 1764 engraved on the glass. It still retains its power, a remarkable proof that the luminosity is not due to any chemical action.

In 1775, Wilson published some valuable discoveries. He extended the list of phosphori, showed that light of various colors could be obtained from them, and made some interesting observations on the effects of heat and cold, to which I shall refer again. I have here a sheet of cardboard painted with various phosphorescent compounds, and a butterfly painted on glass in the same matter. On exposing them to light, you will observe the different shades of color, varying from red to blue, which are developed.

Passing by, in this imperfect sketch, several important names, we come to the greatest name of all, Edmond Becquerel, who for more than thirty years has enriched science by his discoveries. It is impossible for me to give even an abstract of these discoveries. He invented an instrument called the phosphoroscope, by which he was able to detect the phosphorescent power in bodies which remain luminous for very short periods of time. He showed that the power was a very common one in natural, as well as in artificially-prepared substances, and that it was possessed by organic as well as inorganic compounds, and particularly by all fluorescent substances. He analyzed the light emitted in each case by the spectrum, and determined its duration within certain limits of accuracy. These limits are singularly wide, extending from less than the 5,000th part of a second, to hours or even days. Of all phosphorescent bodies, the sulphides of calcium, barium, and strontium, are the most remarkable in regard to the duration of their light; and Becquerel has studied the modes of preparing these compounds with the greatest care, and has revealed many strange and even startling facts in regard to them. They can be prepared by the action of carbon on the sulphates, by the action of sulphur on the oxides and carbonates, and by the action of alkaline sulphides, and even of antimony sulphide, on the last-named compounds. The phosphori prepared by these various processes differ widely in regard to the color and duration of the light which they emit; and it is even possible to obtain shades varying from orange-red and indigo-blue, from calcium only. But this is not all. The calcium-sulphide obtained from calcite is different from that from arragonite, though these minerals have the same chemical composition; and the differences remain even after each mineral has been dissolved in acid, reprecipitated by sodium carbonate, and then ignited with sulphur. This affords a strange, and for the present, inexplicable example of molecular persistency. Becquerel holds that fluorescence and phosphorescence are one and the same phenomenon, the apparent differences being due solely to the different periods during which the absorbed light is emitted. The point is one which merits attentive study.

We now come to the immediate subject of my paper. The late Mr. Balmain, formerly of University College, and an excellent chemist, had for years made a special study of phosphorescent substances. He enjoyed the friendship of the Becquerels, father and son, and aided possibly by them, he succeeded in producing a constant and very powerful phosphorescent substance. Here is some of the substance. You see how strong a light it emits after exposure to the magnesium light. It occurred to him to patent the use of this and other phosphorescent materials, mixed with water or oil, as paints capable of being applied in the ordinary way to any surface. This patent for luminous paint is now in the hands of Messrs. Ihlee & Horne, of Aldermanbury, and, thanks to those gentlemen, I am able to show you a great many specimens of articles thus painted, and so to enable you to judge for yourselves of its proposed applications. I have, in the first place, a number of sheets of cardboard so painted, some of them framed and glazed, which you see emit, after insolation, an amount of light which is really remarkable. With these sheets, we can try a few preliminary experiments, which will assist in illustrating the nature of the phenomena with which we are dealing. Let us, in the first place, test the sensitiveness of the paint. Exposing a sheet of painted card, previously kept in darkness, to Leyden jar sparks from an induction coil, you see that each spark impresses its image on the card, and makes it luminous. It is easy in this way to write luminous words on an otherwise dark card. You know how very short a time each spark lasts, and can, therefore, judge of the short time required for the illumination. The same fact is more roughly shown by striking a lucifer match in front of a dark pane. The momentary flash of the tip is, you see, enough to produce a very visible effect on the paint.

We may now try the very obvious experiment of applying light of various colors to the painted surface. Here is a card partially covered with sheets of blue, green, yellow, and red glass. Burning a piece of magnesium in front of it, you see that no effect at all is produced by the red and yellow light, a considerable effect by the green, and most of all by the violet light. The same effect may be produced in another and less ambiguous manner. We will throw the spectrum on a white screen, which consists of five horizontal layers. The upper one is white paper; the next, sensitive photographic paper; the next, paper saturated with quinine; the next, luminous paint, which at present is dark; and the lowest, luminous paint previously insolated. The spectrum covers all these layers. A long exposure is required to give a very satisfactory result, but we are then able to make out that there is great general similarity between the rays which affect the silver, the quinine, and the luminous paint. The affected portions are nearly, but not quite, coincident. If the experiment is carried on for a long time with a very intense spectrum, another effect which we could not have anticipated is observed in the lowest layer, which has previously been made luminous. The violet and ultra-violet rays increase the luminosity, as we might have expected, but the yellow and red rays not only do not add to the luminosity, but actually take away the light previously present. Another experiment will show this effect more quickly. Here is a sheet, at present luminous; I cover half of it with opaque cardboard, and the other half with yellow glass, and then burn a piece of magnesium in front of it. See the result. The rays which passed through the yellow glass have taken nearly all the light out of that half of the card, while the light on the other remains unimpaired.

For an explanation of this curious phenomenon, we must go back 105 years, to Wilson, who first observed it, though in a different manner. We must remember that red and yellow rays are also heat-rays; and Wilson showed that heat would stimulate the light for a time, only to cause it more rapidly to disappear. On a faintly luminous pane I place a can of hot water. Removing it after a minute, we find that the light in that place is much brighter than before. Cold diminishes the light, which, however, returns when the original temperature is restored. This I can easily show, by applying a block of ice for a minute to the luminous surface. Thus we see the importance, in all experiments on the duration of phosphorescent light, of paying close attention to temperature.

We may now inquire how far this luminous paint is suited for actual use, and what kind of applications can be found for it. We have seen that it is very sensitive to artificial light. To ordinary daylight it is at least equally sensitive, and I have seen it tried, with a success which seemed to me wonderful, in a thick yellow London fog. A very short exposure produces the maximum of illumination, though, of course, the amount of this illumination depends on the quantity and quality of the light. The duration of the light is likewise dependent, to some extent, on conditions. When the paint has been exposed to the intense light of the sun, or of burning magnesium, a good deal of the brilliancy disappears quickly, but after that the fading is very slow; and it may be said that a more or less useful light will remain through the length of an ordinary winter's night. In an extreme case, I was just able to see the dial of a watch by the light emitted from a card which had been in total darkness for twenty-six hours. In this case the card had been exposed to daylight of moderate intensity for two hours.

The next point to be considered is the durability of the paint. The oil seems to protect it wonderfully, even from the acid air and rain of London. I have seen a wooden bowl, which was painted by Mr. Balmain more than a year ago, and has for several months been exposed to the open air in London, in very bad weather. It still preserves its power. Equally effectual is the oil as a protection from water. Here you see the painted model of a life-buoy immersed in water. Its luminosity is very evident. In several respects, therefore, namely, as regards intensity of light, lasting power, and durability under fair condition, these painted surfaces seem likely to be useful as carriers of daylight into dark places and through dark hours.

Let us now turn to the suggested applications of the paint. They may be divided roughly into the ornamental and the useful, and I need only mention a few out of the many that occur to the mind. In the former class, we may include these painted india-rubber balls, which are very pretty, and suggest nocturnal lawn tennis. Statuary, grotto-work, and ornamental tiles, also give striking and beautiful effects. Here is a large bust of the Prince Consort which has been painted and illuminated. You see how fine an effect it produces. Clock-faces, so prepared, show the time all night, and watch-boxes enable us to do as much for our watches. The ends of lucifer match-

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boxes have been painted with the same material. Here are a number of them. There would obviously be no difficulty in finding one of these boxes in the dark.

To pass to more important applications, the roofs of railway carriages have already been treated experimentally with the paint, with results that appear satisfactory. The light would, of course, only be employed for daylight trains which run through tunnels. Then, again, it is proposed to paint the names of streets, the direction a t post-offices, sign-posts, and advertisements, in the same way. Here are some framed notices, "Lodgings," "To Let," and such like, which would easily be seen through, at any rate, a great portion of the night. Still more important is the use of this luminous paint in gunpowder-magazines, spirit-stores, and for purposes of exploration in coal-mines during seasons of danger; besides many such uses that may be thought of.

But of all the proposed uses of the luminous paint, none seem to me so important, or so certain of practical success, as the marine applications. Several of these have already been realized in a satisfactory manner. For signal and mooring buoys, for example, its utility is obvious. It is of the utmost importance that the buoys employed for marking channels should be seen easily, the safe entrance to a harbor or river frequently depending upon the successful passage through a line of buoys. The entrances to Poole Harbor, and to the mouths of the Thames and Medway, are marked in this way, and great difficulty and danger are often experienced on dark nights in making out the buoys. Now, there can be no doubt that a buoy thickly painted with luminous paint would remain visible through the whole, or nearly the whole, of a night. A few evenings ago, I assisted at the trial of a small mooring-buoy at Erith. It was not placed in the water till nine at night, having, of course, been for some hours before in darkness. We found that it was easily visible at distances of over a hundred yards, although the night was not a clear one, and the light to which the buoy had been exposed had not been very good. Yatchsmen, returning to moorings late at night, would find such buoys a great advantage, and many collisions might in this way be avoided. Equally important is the application of the paint to life-buoys. Life-buoys are, or should always be, kept on deck in convenient situations. A life-buoy thrown to a man overboard will often save his life, particularly if the man can swim. But what is the use of throwing out a common life-buoy on a dark night? It is impossible for the man to see it, and it is equally invisible to those on board. Here is a life-buoy painted with the luminous paint. It has been on the roof of this house all day, and has, consequently, been now for several hours in darkness. Yet you see it emits a light that could easily be seen at a very considerable distance. Any decently good swimmer could easily reach it, while the ship's boats would know at once the point to which they must row.

Finally, there seems no doubt of the usefulness of the paint in diving and other submarine operations. We have ready a diver in full dress, painted all over with the luminous paint. He is being illuminated in the next room. Now he enters, and you see what a brilliant and ghost-like appearance he presents. At present one of the greatest difficulties in submarine operations arises from the intense darkness. With this new arrangement every diver will be his own lantern, and will carry down with him a stock of daylight that will assist his labors materially. This dress was actually so used at Southampton a day or two ago. Mr. Phillip Hedger, the Superintendent of the Southampton Dock Company, has sent a letter to Messrs. Ihlee & Horne, in which he says that the diver descended, on a somewhat murky day, into twenty-seven feet of not very clear water, and found that he was able to distinguish the bolt-heads and mussels on a ship's bottom with ease. Mr. Hedger seems to entertain no doubt of the success of the new application.

Let me, in conclusion, draw your attention to the splendid inscription, "Balmain's Luminous Paint," which stretches in letters of fire the whole length of the hall. It has been in darkness for two hours, and yet illustrates very simply the way in which the paint may be made useful for advertising purposes.

I may now conclude this brief and very imperfect sketch. I heartily wish the exposition had fallen into better hands, and particularly that our chairman, whose well-known researches on actinic light have added so much to our knowledge, would have taken the matter in hand himself. However, I have done my best, and can only hope that you have acquired some new ideas on the subject, and will in future watch with interest for further useful applications of the luminous paint.

THE BOSTON SOCIETY OF ARCHITECTS.

A special meeting of the Society was held at the President's office, on Wednesday last, to consider and act upon the report of the special committee which was appointed at the March meeting to consider the communication of the Board of Trustees, suggesting a dissolution of the connection between the Institute and the local Chapters.

The report of the Committee as amended at this meeting is as follows: —

The Special Committee have examined the Constitution and By-Laws of the Institute, with a view of ascertaining what changes would best meet the suggestions of the convention held in New York in November, and the opinions of this Society as expressed at the meetings in March and April, and, in accordance with the instructions given them at the April meeting, herewith present a new draft of the Constitution of the Institute to be considered by this Society, and, if approved, to be forwarded to the other Chapters of the Institute for their consideration, with a view to definite action at the Philadelphia Convention in November next.

The changes proposed consist in the omission of all reference to Chapters, thus making the Institute an independent national organization; in the omission of the Librarian from the list of officers; and in omitting "Regular Meetings, Lectures upon topics of general interest, a School for the education of architects, Exhibitions of architectural drawings, a Library, and a Collection of Designs and Models," from the enumeration of the means to be employed by the Institute in the furtherance of its ends. The holding of an annual convention, and the establishment of a permanent council, or board of trustees, to be elected at each convention, are thus made to appear in name, as they are in fact, the chief instrumentalities through which the Institute seeks to accomplish its ends.

The Constitution as thus modified would read as follows: —

CONSTITUTION.

ARTICLE I.

The name of this Society shall be The American Institute of Architects.

ARTICLE II.

The objects of this Institute are to unite in fellowship the Architects of this continent, and to combine their efforts so as to promote the artistic, scientific and practical efficiency of the profession.

ARTICLE III.

The means of accomplishing this end shall be the establishment of a permanent body of officers, the holding of an annual convention for the discussion of subjects of professional importance, and any other means calculated to promote the objects of the Institute.

ARTICLE IV.

1. The Institute shall consist of Fellows and Honorary Members.
2. The condition of membership as Fellows shall be, the honorable practice of the profession, in accordance with the Constitution and By-Laws of the Institute.
3. No member shall accept direct or indirect compensation for services rendered in the practice of his profession, other than the fees received from his client.

ARTICLE V.

The officers of the Institute shall be a President, Vice-President, Treasurer, Secretary and Corresponding Secretary.

ARTICLE VI.

The government of the affairs of the Institute, and the election of members and officers, shall be in accordance with such By-Laws, not inconsistent with this Constitution, as shall be enacted by the Institute.

ARTICLE VII.

This Constitution shall be altered or amended only upon a two-third vote of the members present at an annual convention of the Institute, such alteration and amendment to be ratified by two-thirds of all the members of the Institute.

The By-Laws would have to be modified by making corresponding changes. The only other alterations we would suggest in them would be changing the name of the Board of Trustees, calling them the Council, since the holding of property would not be in contemplation as one of their prominent functions.

The effect of these changes would be to leave every local society to manage its own affairs and spend its own money, while the Institute, as an independent national organization, would attend to those general interests of the profession which no local association could assume to direct or control. Its chief business would be the conduct of its annual meetings, as is the case with the various associations for the advancement of science, and its chief expenses would be those attendant upon these meetings. These would be met partly by the annual fees of membership, and partly, as in the case of the scientific societies, by local contributions at the time of the convention and the fees of the temporary members.

At the same time, the officers of the Institute, holding over from one convention to another, would maintain its existence and be on the watch for occasions to further its purposes, under such conditions as the By-Laws or the instructions of the conventions might impose.

It may be anticipated that both the Institute and the local societies, freed from the embarrassments of an organic connection, would enjoy an increased activity and usefulness each in its own field, an enlarged membership and a diminished scale of fees or assessments.

MR. HYATT'S LATER EXPERIMENTS ON CONCRETE FLOORS.

With reference to the American experiments alluded to in my former communication, the sections were made at New York, in the fall of 1878, and the final tests of breaking were made when the samples were about eight months old. The cementing materials used were best English Portland cement, in some of the sections, and American "plaster of Paris" in others. The bricks were cheap American red bricks, worth five dollars (one pound) a thousand; size of bricks, 4 in. by 8 in. by 2¼ in. Of these materials, *cement* and bricks, a brick beam 2 ft. by 11 ft. 11 in. by 13 in. depth at centre, and 11½ in. at the ends, was made with a gridiron tie composed of nine blades or bars, each 1½ in. by ¼ in. The beam had a clear span of 11 ft. 1½ in.; the load was applied at the centre, upon a bearing-block 1 ft. square; the deflection, regular and constant, from ¼ in. at 5 tons,

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to 1⅜ in. at 16 tons, when the beam gave way by the crushing of the bricks.

Seven small floor-sections, each 5 ft. 11 in. by 2 ft. 2 in., were made of bricks laid on their edges, the thickness of flooring being consequently 4 in., except an increase of 1 in. at the centre, made by a layer of the cement in the case of four out of the seven samples. The clear span of these sections was 5 ft. 2 in. in each case. The gridiron of tie-metals was composed of ten "knowing blades" each 2 in. by ⅛ in., very tiny fellows, but very "magical." One of the sections, 4 in. thick, bricks joined by Portland cement, at 2 tons deflected ⅛ in., at 4 tons ¼ in., at 7 tons 7/16 in., and gave way. The other two sections of 4 in. thickness, bricks cemented with plaster of Paris, gave results as follows: One of the two at 3 tons deflected ¼ in., at 5 tons ½ in., at 8 tons 9/16 in., and gave way. The other at 1 ton deflected 1/16 in., at 5 tons deflected ½ in., and gave way. Two sections, bricks cemented with plaster of Paris 5 in. thick at centre, 4½ in. at the ends, each with 1 ton deflected ⅛ in., 3 tons ¼ in., 5 tons 5/16 in., 6 tons 7/16 in., and one gave way; the other at 8 tons deflected ⅜ in., and gave way. The remaining sections, two in number, bricks united with Portland cement, each one 5 in. at centre, 4½ in. at ends, behaved as follows: one of the two at 2 tons deflected ⅛ in., 4 tons ¼ in., 6 tons ½ in., and showed signs of distress at joints on the under side; at 7 tons deflected ⅝ in., at 8 tons ¾ in., at 9 tons 1 in., and gave way. The other one, with 2 tons, deflected 1/16 in., 2 tons 3/32 in., 4 tons ⅛ in., 5 tons 1/16 in., 6 tons ¼ in., (the weight being now removed, the floor returned to its original level); at 7 tons 5/16 in., 8 tons ⅜ in. (the section now showed signs of distress on the underside at the joints, but no indication of cracking at the top), at 9 tons deflected 7/16 in., at 10 tons ½ in., and gave way. In each of the seven sections a fair 6 in. of flooring remained uninjured on each side of the destroyed central portion of the floor, the part actually broken down being a width of 14 in. only, out of the 26 in. composing the width of the section. Possibly these facts may surprise others, as much as they did me at the time. THADDEUS HYATT.

STEAM AS AN EXTINGUISHER.

COMMENTING on Mr. Joseph Bird's account of the manner of extinguishing fires with steam at Downer's Kerosene Works in Boston, which we lately published (*American Architect* for April 17), Mr. J. B. Moore of New Orleans writes to the *Fireman's Journal* as follows: "I have neither time nor desire to enter into a full disquisition on the subject for the information of either Joseph Bird or the many other theorists who write on the subject so learnedly, but will, with your permission, give them a few of the points which we have demonstrated to our entire satisfaction both practically and experimentally. These are as follows: First: The putting out of fire is best accomplished by excluding the oxygen of the atmosphere. Second: By absorption of heat. Third: Water serves the first of the above-named purposes well. Fourth: Water, if not heated, is further an important factor, in that its heat-absorbing property comes into play more readily than any other attainable agent. Fifth, Steam is the least potent of all the proposed agents for the extinguishment of fire — utterly inutile, in fact, until it condenses, and then far inferior to cold water. How then, say you, is it that Joseph Bird and other well-meaning men have testified so freely as to the effectiveness of steam? My answer is that they have simply observed an effect, and jumped at conclusions as to the cause. The fire was extinguished by the exclusion of oxygen; a result, not of the injection of steam into the room, but of closing it so as to be air-tight or nearly so. We had fallen into this same error here at one time, but are thoroughly cured of it now. In the case of the Mississippi steamer, James Howard, her battery of ten boilers was turned loose into the hold, giving a product of steam that all of the steam fire-engines of New York could not have equalled. The fire was subsequently extinguished by scuttling the boat. Two or three other experiences of this sort settled the matter beyond all peradventure in this latitude. The tug-owners in this harbor are intelligent men of large experience in this matter, and the tugs of necessity possessed of very large steam-generating facilities, yet these very men have recently provided themselves with two carbonic-acid-gas machines of very large capacity for use in ship fires. These are additional to one that has been in operation in this harbor for nearly five years, earning in that time $147,000 in the way of salvage money for her owners and crew as a reward for having saved twelve cotton-laden ships whose cargoes were on fire in the hold."

CEMENT TEGELS.

NEW YORK, May 4, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — Allow me to correct the statement in your issue of April 24, in which you say, "A new industry, new at least in that country, has attained considerable proportions in England," the "Dutch cement tegels." This, to my knowledge, is not new, for the Dutch tiles in fireplaces were commonly used forty and fifty years ago in England, and I know very many occasions where my father, a builder in England, was employed to remove these Dutch tiles to make room for the more modern improvements, and now those modern improvements are doubtless being removed to make room for the now modern improvements, to wit, the Dutch tiles.

The great strides both England and this country have been making in the manufacture of tiles of every description, will doubtless far exceed our less ambitious competitors, the Hollanders. Move on, is the word, and both countries understand it.

Respectfully yours, GEO. HAYES.

STEAM-METERS.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — Can you inform me if there is such a thing as a steam-meter in use, and how the steam-heating companies of New York measure their heat; by space of heating surface, or by the month, if not by meters? Can you give me the address of a steam-heating company in successful operation? Yours truly,

WESTERN, A. & C. E.

[No very practicable steam meter has yet been introduced, to our knowledge; certainly none is in general use. Some of the steam-heating companies have tried measuring the condensed-water returned from the radiators, which would roughly represent the steam consumed for heating. There are no steam-heating companies yet in full operation in New York, so we cannot say how they will measure the steam supplied. The company at Springfield, Mass., charges fifty cents for the season, for each square foot of radiator surface, which is a very good way, for some rooms will be comfortable with one-tenth of the radiating surface which others require, and the house-owner can have one foot or a hundred put into his rooms, to ensure the degree of warmth required in each, and pay accordingly. There are steam-heating companies in successful operation at present in Springfield, Mass., Auburn, N. Y., Lockport, N. Y., and Detroit, Mich. How they are to be addressed we do not know. Perhaps some of them will inform us. — EDS. AMERICAN ARCHITECT.]

A SCULPTOR'S RIGHT TO HIS MODEL.

IN the *American Architect* No. 208 we published a letter from Mr. Bartlett, a Boston sculptor, in which were asked certain questions which appertained to the matter of artistic copyright, which is at present receiving so much attention abroad. How far our comments at the time are supported by the opinions of others is shown by the following letters, which Mr. Bartlett has received from an English sculptor in good standing, and from M. Dubois.

152 BUCKINGHAM PALACE ROAD,
LONDON, S. W., April 13, 1880.

The English law gives absolute ownership of all rights in his work to the sculptor for life-time and for thirty years after his death "to his heirs, administrators and assigns." This holds good even with portrait busts, of which not even photographs may be published without the consent of the author. Any infringement of a sculptor's copyright is liable to be punished by law. All the law requires of the sculptor to maintain this right is that he shall sign and date his work when it leaves his hands. The law regarding painting is not so satisfactory. Yours in haste, GEORGE SIMONDS.

M. Paul Dubois, Director of the Government School of Fine Arts in Paris, says, "No one has the right to reproduce or use the original studies of a sculptor or painter, for a bust, statue or painting, without his consent, since in so doing the person is punishable by law."

In this connection we may mention that a Parisian court has lately instructed a sculptor, Marietti by name, that he cannot compel payment for a portrait-bust of a sitter whose likeness he has failed to catch. The court, however, evidently believing that authorized labor is deserving of some compensation, granted the unsuccessful sculptor a certain time in which to attempt to so alter the bust that the likeness could not be disputed by the sitter or his friends.

NOTES AND CLIPPINGS.

THE "MEMORANDUM LOCKERT." — M. Louis Lockert, the director and proprietor of *Le Technologiste*, has discovered that the reason that the readers of scientific publications are comparatively few in numbers is because the would-be readers have not enough time at their command to read what is written, even if they knew where to find the sort of reading they would hold profitable, or had the means to spend in obtaining it. It has occurred to M. Lockert that this is a difficulty which can be solved, and his solution takes the form of the *Memorandum Lockert*, a semi-weekly publication, which is to contain a running and classified index of all articles on subjects of interest which appear in the French and foreign scientific journals and periodicals. Something of the same sort was undertaken last year in England, but the attempt was a failure, and M. Lockert's would probably share the same fate, were it not that he gives a practical value to his new publication, which its English prototype lacked. It is done in this way: any subscriber whose curiosity or interest may have been excited by the title of any article given in the *Memorandum*, can obtain a brief summary of it by enclosing one franc's worth of postage-stamps to the publisher. Furthermore, by paying twenty-five francs he will receive the *Technologiste*, in which such brief summaries will be published, and his privilege as subscriber will give him the right to select for publication in that weekly journal thirty such summaries of articles whose titles in the *Memorandum* have attracted his attention. Again, any subscriber to the *Memorandum* who may desire it will receive a full translation of any paper he may select, without the fear that it shall be afterwards published in the *Technologiste*. In this way he would be enabled to acquire a special and private knowledge on the subject which interests him. In many ways the scheme, it spite of its obvious difficulties of administration, seems an excellent one. We will only say that we hope that succeeding issues will not, like the sample copy we have received, be printed in script letters autographically reproduced from stone.

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A New Phase in the Question of Ancient Lights. — There is now approaching completion, at the northwest corner of Fifth Avenue and Fifty-seventh Street, New York, a costly house, the property of Mr. Edward Kemp. The building extends eighty-five feet on Fifty-seventh Street, and there is a space of fifteen feet between it and the house on the adjoining lot. This house is occupied by Mr. Frederick Mead. In the wall facing the avenue there are six windows, which, until the erection of the Kemp house, overlooked the vacant lot and commanded a view of the avenue. Mr. Kemp objected to these windows, and desired to have them walled up. Mr. Mead suggested instead that the sashes should be filled with opaque glass. Mr. Kemp determined to close up the windows, and about a month ago he had iron shutters placed over the windows, and held in position by iron tubing braced against his house. Mr. Mead discovered that the shutters rested on his window-sills, and he put men at work to cut away the sills. This done, the shutters fell to the ground. On Wednesday aggressive measures were resumed by Mr. Kemp. An iron trellis has been built against Mr. Mead's wall. To the trellis are attached, directly opposite the offensive windows, iron plates five feet square, which completely shut out all light. It is estimated that the structure will cost not less than $1,000. Ivy and climbing vines are to be trained over it so that its hideousness will be concealed from view.

Testing the Atmosphere of Philadelphia School-Rooms. — An examination is now being made by Medical Inspector Taylor, of the Board of Health, of the various school buildings in Philadelphia, with a view to ascertaining their general hygienic condition. The dimensions of every room and the average number of pupils in each is taken, for the purpose of ascertaining the amount of air required and consumed, and its character. The air for this purpose is obtained by taking into the room a six-ounce bottle filled entirely with water, and by pouring the contents out the bottle becomes filled with the air; then it is secured by a soft rubber cork, which renders the bottle perfectly air-tight. These bottles of air are labelled, and, when opportunity offers, the contents are analyzed and a minute record kept of the result. Dr. Taylor proposes to make a report of the schools examined after the present term closes in June, and proceed with the examination after the re-opening of the schools in September, the examinations being made only during school hours.

A New Orleans Association of Artists. — The artists of New Orleans have lately formed what is designed to be a permanent organization, known as the Southern Art Union, its object being to advance æsthetic tastes, promote art education, and enable all Southern artists to have a permanent gallery of exhibition in that city.

Masts and Mast Trees. — In the mast trade, the fir, from its height, its straightness, and its lightness, in one variety or other, is rigidly adhered to. Roughly speaking, they may be classed under five heads, viz.: 1, Quebec yellow pine; 2, Quebec red pine; 3, United States pitch pine; 4, Oregon pine; 5, Kaurie pine. The yellow pine has been fairly used and tried; but being soft, easily broken, prone to decay at the level of the deck, and, what is of the greatest consideration, very costly, it is now but sparingly used. The red pine, although a fine grown tree, is rarely sufficiently straight for the purpose of masts, and in consequence is but little used. The pitch pine may to-day be termed the true "mast-tree." It has all the requisite qualities for this purpose, but its weight is a great drawback, and it is not considered a very durable wood. These objections are more than compensated for by its cheapness, and the clean, sound character of the wood; and hence, in almost every ship-yard in England it is more largely used than any other pine. The Oregon or Douglas pine ranks, from its great size, as the first of the mast trees. These masts are sent to us in a hewed form, faultless on every point. This wood, from the cost of transit, cannot be brought into competition with other shipments; but where size is a consideration, it carries all before it, as masts of one hundred and ten feet in length, and thirty-two inches diameter, are by no means exceptional. The curious on this point will be pleased to inspect the celebrated flag-pole in the royal gardens of Kew, which is an example, one hundred and fifty-nine feet in length, and of proportionate thickness. The Kaurie pine ranks with the Oregon pine in being a monarch of the forest. This is otherwise known as the Australian pine, or Norfolk Island pine. Its quality for masts is everything that can be desired, and although its cost is very great, owing to the excessive sea carriage, it is by no means a rarity in this country. Some years ago, the governor of New Zealand sent a gigantic mast to the English Admiralty, and a friend of ours, who was a passenger home with this tree, says it was lashed to the masts and bowsprit, and projected over the head and stern of the ship thirty feet. It was found to be highly suitable for masts and spars, and a commission of experts frum the dock-yards was afterward sent out to examine and report upon the Australian forests. A tree of this class was felled on a farm near the Maharangi River, intended for the 1851 exhibition in London; but the time allowed for transport being too short, the project was abandoned, and the tree was left upon the ground. The length of the bole up to the branches of the bushy head was one hundred feet, and its diameter, at the butt was ten feet. Laslett mentions a still larger tree, which measured eighty feet to the branches and twenty-four feet in diameter. About fifteen years ago a parcel of sixty logs arrived in Liverpool on consignment to Mr. Edward Chaloner; we were told they averaged ninety feet in length, and squared up to three feet, and that they were perfectly clear and sound. It would appear with the mast trade, as with many other industries, there is a constant thirst for change; the latest fashion is the construction of the lower masts and the principal spars of wrought-iron, a system that places, for once in the career of English shipbuilding, the growth of our masts in our own hands. The objection taken is that they are heavy, and in case of disaster they cannot be felled and thrown overboard; but this appears to have little consideration, for the manufacture of tubular iron masts is becoming very general, and to-day there are few of our first-class ships but what are so fitted in their rigging. — *The Timber Trades Journal.*

The Diseases of Stone-Workers. — The majority of trades are attended by peculiar ailments, which have been described in familiar language by Dr. Rabagliati, of Bradford, in a series of articles published in Messrs. Cassell's Great Industries of Great Britain. Workers in stone, it appears, suffer more than is generally supposed. Labor is generally out of doors, and the muscles are exerted equally, but in spite of these advantages, the duration of life among stone-hewers is said to average not more than from thirty-three to forty years. Quarrymen, in addition to constant liability to colds, inflammation of the lungs, and rheumatism, from working in wet and damp, often meet with severe sprains and ruptures. The injury, according to Dr. Rabagliati, almost always occurs to the fibrous ligaments which pass between the contiguous ends of bones, such as the knee-joint. The sprains occasionally end in permanent incapacity for heavy work. Quarrymen are not, however, the greatest sufferers. It was found in France that among the workers in the flint used for pottery, consumption became epidemic, and the average duration of life sank to nineteen years. Affections of the chest are the cause of sixty-one or sixty-two per cent of the illness among stone-hewers. Dr. Rabagliati considers that acquaintance with the structure of their bodies by quarrymen and others engaged in heavy work would be the best means of preventing the injuries to which they are liable. A knowledge of the structure and composition of a joint would suggest the proper directions for applying weights, and the extent of the mass which it is prudent to deal with. It would also be very often of the greatest utility if workmen, or rather foremen and superintendents, knew something of the manner of treating accidents. The severity of sprains and fractures is generally increased by clumsiness in first dealing with the sufferer. — *The Architect.*

Completion of the Trojan Excavations. — The St. Petersburg *Golos* has received a letter from the famous archæologist, Schliemann, dated Athens, March 14, and prints this extract: "I have just returned from Asia Minor, where I have at last finished that digging out of Troy which I began in 1870. During ten years I have struggled with great difficulties, among which, perhaps, the most troublesome has been the large amount of débris under which the ancient city was buried. It has been necessary to dig down and dig up the ground for more than sixteen yards below the surface. But I am fully recompensed for all my trouble. I found the remains of seven different ancient cities; the last of them was the Ilion of Homer. That city was built by the Æolians, banished from Greece by the Dorians in the eleventh century before our era. In one of the buried cities I found many statues of Minerva, with the owl's head; whence her name of Glaucopis. In another city were found many images of the divinities. But the most interesting and important of all discoveries is, of course, the city of King Priam. Every article found in the ruins of that city bears unmistakable signs of having been destroyed by fire in time of war. There were discovered many remains of human bodies in full armor. I dug out and cleared away the débris from the entire wall that surrounded the city, and also from all the principal buildings. Now I am finishing a large volume in English, describing, with full details, all my discoveries, and containing two hundred illustrations of the most important of the discoveries. My Trojan collection is now in London, but at the end of this year I shall take it to my villa in Athens, which is fire-proof, built only of marble and iron. I have received large offers for my collection from the United States, England, France, and Germany, but I cannot part with it for any money in the world."

Napoleon's Tomb and the Washington Monument. — The New York *Evening Post* says that a stone from the tomb of Napoleon the First, at St. Helena, intended for the Washington Monument, is to be presented to the Washington Monument Society, with the appropriate documents. It was only recently found, after it had been lost sight of for nineteen years. When our naval vessels were ordered home from foreign waters at the opening of the civil war in 1861, the man-of-war Mystic, in sailing from the East Indies, stopped at St. Helena, and some one proposed bringing home a stone for the Washington Monument from Napoleon's tomb; this was done. The stone was landed at the Brooklyn Navy Yard, and then forgotten. Recently Admiral Powell made inquiries, and it was found stowed away at the Washington Navy Yard, and is reported by Commodore Febiger to be in good condition.

The Sanitary Condition of Memphis. — About fifteen miles of new sewer have been laid to date, and house connections are being made as rapidly as the force of plumbers can work. Although unfavorable weather has prevented the completion of the entire system, all the business portion of the city and the thickly-settled portion west of the bayou are substantially finished. The work in comparatively clean soil and the less thickly-built region east of the bayou will be continued until June 1. Lists recently made, it is claimed, demonstrate the success of the new system of sewerage. With this important work practically accomplished, and with the general sanitary improvement effected by the labors of the past winter, the municipal authorities and local Board of Health are sanguine of the continuance during the summer of the present healthy condition of Memphis. The published mortality tables for the past month show Memphis to rank seventh in point of healthiness among forty-six cities of over thirty thousand population.

The Last of one Labor Union. — The Packingmen's Protective and Benevolent Union, the organization which began the mammoth strike at the Chicago stock-yards last winter, and which at one time comprised nearly ten thousand members, has virtually disbanded, only twenty-seven members appearing at a called meeting, and not one of them being willing to serve as an officer of the organization. As a consequence, no election was held, and the meeting broke up.

The Venus of Pergamos. — A beautiful head of Venus, discovered with the friezes of Pergamos, now in Berlin, lacks a nose. Casts of the head have been made aud the nose is to be restored. The head is said to equal in beauty that of the Venus of Milo.

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BUILDING INTELLIGENCE.

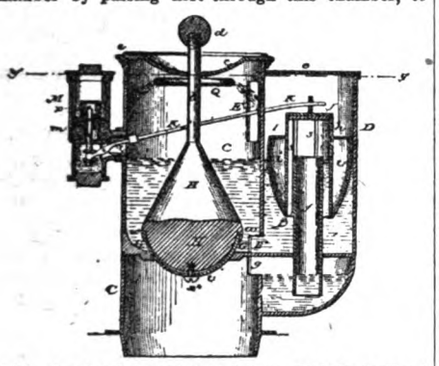
[Reported for The American Architect and Building News].

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

225,362. WATER-CLOSET. — Moses F. Gale, Brooklyn, N. Y. The cut only shows the plunger-chamber in the middle, the overflow chamber on the right, and the supply-valve on the left. On the side towards us is placed the crockery receiving bowl which empties its contents into the soil-pipe below the plunger-chamber by passing first through this chamber, to



which the bowl is connected by a slightly inclined throating, which is received in a casting on the hither side of C. The plunger-chamber is divided into two parts by the horizontal diaphram, G, which is also continued across the overflow chamber D. In the centre of D is a hole through which the contents of the bowl are discharged into the portion of the soil-pipe immediately above the usual S-trap whenever the plunger, H, is raised by the pull-up handle. The plunger, H, which has a conical upper part so as to offer as little resistance as possible when the handle is raised, fits tightly into the valve-seat in G; a perfectly tight joint, one accommodating itself to any inequalities which may be formed by the lodgment of fecal matter on the edges of the valve seat, is formed by leaving between the hemispherical body of the bottom of the plunger and the stiffish rubber covering, *u*, an air-space, which is effected by making the rubber of a different curvature from the bottom of the plunger. At the top of this chamber C, is a small circular perforated pipe, which washes out the inside of the chamber each time that fresh water is admitted to the bowl. The overflow is effected through the chamber D. The upright pipe F passes through the diaphragm G, and its lower end passes below the surface of the water constantly retained in the lower part of the chamber by the wall of the soil-pipe; water flowing out only when it has risen to the level of the opening *g*. The plunger-chamber C and the chamber D are in communication with one another by the two openings E, through which the valve-rod K passes, and F, and it is by means of this opening that water in the bowl and in the two chambers is kept at the same level. Fitting over and around that portion of the overflow pipe which rises above the diaphragm is another pipe *h*, whose lower part is enlarged by the circular air-chamber *i*, the office of which is to float upwards as water enters the bowl and chambers, and by so doing, through the agency of the lever-arm, K, attached to its top, to shut off the water-supply, as would be done by an ordinary ball-valve float. A packing, *g*, is fitted at the top of *h*, so that while the plunger is raised and the valve *h* lowered the top of *f* may be tightly sealed. It will be seen by inspection that the overflow *f* is always doubly sealed, both at top and bottom. Another feature of this closet, not shown in the cut, is the way in which the bowl is secured to the soil-pipe.

227,130. SEWER-TRAP. — Wm. L. Randolph, Brooklyn, N. Y.

227,146. CURTAIN-FIXTURE. — William Campbell, Brooklyn, N. Y.

227,171. FIRE-PLACE HEATER. — Robert Logan and John Logan, McKeesport, Penn.

227,200. CURTAIN-FIXTURE. — Geo. Baldwin, South Manchester, Conn.

227,203. LIME-KILN. — Andrew Barron, Janesville, Wis.

227,208. LEADER-PIPE. — Emil Bittenbring, Hartford, Conn.

227,210. VISE. — James M. Black, Chicago, Ill.

227,266. SHUTTER-FASTENER. — Matthew F. Kirk, Chelsea, Mass.

227,268. COATING IRON SURFACES. — Joseph Kintz, West Meriden, Conn.

227,269. CURTAIN-CORD TIGHTENER. — William Klemm, Pittsburg, Penn.

227,275. CARPENTER'S WORK-BENCH. — Geo. Lettenmyer, Little Georgetown, W. Va.

227,312. LADDER. — John L. Sippy, Venice, Ill.

227,318. WEATHER-STRIP. — David F. Stambaugh, and Henry W. Crail, Effingham, Ill.

227,324. FIRE-ESCAPE. — Richard H. Tucker, New York, N. Y.

227,327. LOCK. — Rudolph Vollschwitz, Elizabeth, N. J.

9,183. (*Re-issue*). COMBINED SQUARE AND BEVEL. — Orvil R. Chaplin, Boston, Mass.

9,184. (*Re-issue*). CURTAIN-FIXTURE. — Hermann Herlt, New York, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since the last report.

Chas. Kurtz, three-st'y brick dwell., No. 7 Gough St., between Pratt and Granby.

G. W. Hopper, 13 two-st'y brick dwells. on Washington St., between Hoffman and John Sts.

G. W. Hopper, 5 two-st'y brick dwells. on Hoffmann, St., between Washington and Chapel.

G. W. Hopper, 7 two-st'y brick dwells. on Chapel St., between Hoffman and John.

Trustees of Biblical Institute, three-st'y stone building, cor. Fulton and Edmonson Aves.

M. M. C. Croine, three-st'y brick building, Edmonson Ave., near Mount St., 17'5" x 90'.

St. Stanislaus Society, two-st'y brick and stone church, 46'6" x 100', on Ann St., between Alice Ann and Lancaster Sts.

Academy of Visitation, addition and improvement to building cor. Park and Centre Sts.

C. L. Laffill, 5 three-st'y brick buildings on Mosher St., near Calhoun St.

Christian Schutz, three-st'y brick building, Ensor St., between Monument and Forrest St.

House of Good Shepherd, three-st'y brick building, cor. Mount and Lombard Sts., 30' x 140'.

Johns Hopkins University, five-st'y brick and stone warehouse, 75' x 180', on Sharp St., between Lombard and German Sts.

CHAMBER OF COMMERCE BUILDING. — Mr. Niernsée, has been appointed architect for the new building for the Chamber of Commerce, to be occupied by tho Corn and Flour Exchange. Competition drawings were submitted last fall by two prominent architects of Baltimore, and one from Chicago, but no selection of design was made till last week. The site of the new building is on the corner of Holliday and Second Sts.

CHURCH.—The congregation of Emanuel M. E. church contemplate building a new church on the corner of Myrtle Ave. and Mosher Sts. It will be 55' x 75', and cost $15,000 or $20,000, and will be built somewhat after the style of the First English Lutheran Church, with lecture-room and class-rooms below.

HOUSES.—Mr. J. Boyden Lee is about to build a residence, N. W. cor. Charles and John Sts., 22' x 68'. J. A. & W. T. Wilson, architects, are preparing the drawings.

STABLE.— Dr. Wm. H. Hoopes is having drawings prepared for a stable, 26' x 40', on West Baltimore St., to be of his patented artificial stone; J. A. & W. T. Wilson, architects.

SUBURBAN HOUSE. — Mr L. B. Purnell, of the firm of Hurst, Purnell & Co., is building a cottage on Calverton Road, near the city limits. It will be 60' x 100', 2 stories and attic, and tower 65 feet high, and will cost $20,000. Mr. Jackson C. Gott is the architect.

Boston.

BUILDING PERMITS.—*Brick, cor. Washington and Ash Sts.*, for Mrs. C. G. Crocker, 1 tenement, 21' x 124', four stories; W. S. Cogswell, builder

386 *Commercial St.*, 1 tenement, 54' x 104', four stories, for J. C. and E. A. Loud; C. S. Stone & Co., builders.

50 *Lincoln St.*, for N. Whiting, 1 store, 34' x 73', five stories; G. H. Young, architect.

Cor. Bedford and Chauncy Sts., for W. H. Wellington, 1 store, 64' x 90', six stories; T. E. Stuart, builder; S. J. F. Thayer, architect.

331 *Beacon St.*, for R. Dabney, 1 dwell., 25' x 60'; D. Davis & Son, builder.

East Fourth St., for Blind Asylum, 1 school-house. 25' x 50', four stories; Lock & Nolan, builders.

Brook Place, No. 20, 1 dwell., 22' x 36'; M. C. Mann & McLaughlin, owners and builders.

Congress St., No. 19, for People's Ice Co., 1 ice house, 32' x 150'; C. B. Leavitt, builder.

Forest Garden, No. 23, for W. Austin, 1 theatre, 30' x 55'.

HOUSES.—Plans are now making for a double house off Dale St., Highlands, for Dr. Green; cost, $4,000; Mr. J. H. Besarick, architect.

Corner Boylston and Dartmouth Sts. are building two houses from the designs of E. A. P. Newcomb, architect, for Messrs. Smith and S. A. Carleton; J. McNeil, builder.

Brooklyn.

BUILDING PERMITS. — *Oak St.*, 1 one-st'y frame stable 30' x 100', with wing 30' x 120'; cost $2,000; owners, Knickerbocker Ice Co., 432 Canal St., New York.

Quincy St., 6 three-st'y brick dwellings, 16'8" x 40'; cost, each, about $3,500; owner, Darius C. Davison, 639 Greene ave.

Columbia St., 1 two-st'y brick stable, 28' x 25' x 40'; cost, $2,700; owner, J. W. Mason, 140 Hicks street; architect, D. B. Provoos; builders, J. Allen and J. Hood.

Gold St. cor. John St., 1 one and two-st'y brick shed, 75' x 87' x 83'; owners, C. T. Reynolds & Co., 106 and 108 Fulton St., New York; builders, Robert Hoile and John McDicken.

Macomb St., 1 three-st'y brick store and tenement, 20' x 40'; cost, about $3,000; owner, Daniel Orr, 32 Macomb st.; architect, Chas. Werner; builder, John McLoughlin.

Lefferts Place, 6 three-st'y brown stone dwell'gs, 16' 8' x 45'; owner, A. Treadwell, cor. Lefferts pl. and Franklin av.; architect, R. Dixon; builder, John Frost.

Gates Av., 2 four-st'y brown stone stores and tenem'ts, 21' x 56'; owner, S. L. Swimm, 389 Putnam av.; mason, Wm. Uris.

Lewis Av., 1 two-st'y frame dwell'g, 22' x 40'; cost, about $3,500; owner, S. R. Hooker, 9 Stuyvesant av.; architect, Fred. Weber; builders, George Cutler and George Schiel.

Park Pl., 3 three-st'y brown stone dwell'gs, 20' x 45'; cost, about $7,000 each; owner, Mary Magilligan; builder, John Magilligan.

Bergen St., Nos. 374 and 376, 2 four-st'y brown stone flats, 20' x 45' 2"; owner, Geo. W. Brown, 728 Fulton street; architect, C. B. Sheldon; builders, Levi Brown and C. E. Cozzens.

Greene Av., 2 two-st'y brown stone dwell'gs, 20' x 42'; owner, F. C. Vrooman, 444 Gates av.

Jay St., cor. Willoughby st., 1 five-st'y brick restaurant and lodging-house, 30' x 75' 6"; owner, Good Samaritan; architect, J. Mumford; builder, not selected.

Chicago.

BUILDING PERMITS.—Thomas Mackin, repairs of store, cor. of Kinzie and State streets; cost $15,000.

R. T. Crane, one-st'y pipe factory; Stewart Ave., near Judd; cost, $40,000.

Chicago, Rock Island and Pacific Railroad Company, additional story on building on Van Buren St.; cost, $12,000.

Munger, Wheeler & Co., elevator, 101' x 200', cor. Canal and Fulton Sts.; cost, 200,000.

Board of Education, three-st'y school house, cor. Eugene and Hammond Sts.; cost $30,000.

New York.

ALTERATIONS. — *Allen St.*, No. 202, full story to be made of atic, new store front, and internal alterations; cost, $2,000; owner, L. Rothschild; architect, Julius Boekell.

Sixth Av., cor. 19th st., damage by fire to be repaired; cost, $5,000; owner, John J. Astor; architect, Thomas Stent; mason, Mark Eidlitz; carpenter, John Downey.

Kingsbridge Road, a one-story brick extension, 100' x 70'; cost, $3,000; owner, Isaac G. Johnson; architect, S. Francis Quick; builders, J. & G. Stewart.

Forty-fourth St., No. 204 *East*, interior alterations; cost, $2,000; owner, S. J. Donvan; builder, J. V. Donvan.

Fourteenth St., Nos. 106 *and* 108, *East*, one story brick extension on rear 50' x 29', first story iron columns and lintels; cost, $4,000; owner, John H. Huber; architect, Jobst Hoffman.

Twenty-Third St. No. 234 *East*, three-story extension on rear, 10' 6" x 23'; cost, $3,000; owner, John Bisco; architect, John Luder; mason, Jas. Whyte.

Perry St., No. 3, three stories to be added to brick extension; cost, $2,000; owner, estate of E. Bloomer; mason, James H. Parker; carpenter, David Wilkie.

Bond St., Nos. 46 *and* 48, one-story brick extension, 52' x 60'; cost, $3,500; owners, National R. R. Publication Co.; builder, John W. Crawford.

Seventy-fourth St., No. 18 *East*, four-story extension on rear, 17' x 14' 6"; cost, $12,000; owner, L. H. Niles; architects, D. & J. Jardine; builders, A. G. Bogert & Bros.

Fourteenth St., No. 4 *West*, one-story brick extension on rear, 20' x 33', and a new store front; cost, $6,000; owner, W. Jennings Demorest; architect, W. Jones; builders, Jones & Co.

Forty-Third St., five-story brick extension on east side, 100' x 56'; cost, $20,000; owners, E. S. Higgins & Co.; builders, A. A. Andrews & Son.

Lexington Av., No. 735, two-st'y brick extension on rear, 9' 6' x 12'; cost, $2,000; owner, Wm. Lauer; builder, Thos. Sanderson.

Twenty-Fourth St. No. 125 *East*, interior alterations; cost, $2,600; owner, Jacob G. Bebus; architect, Joseph M. Dunn; builders, N. & H. Andruss.

Broadway, No. 72, front and rear walls to be rebuilt, also interior alterations; cost, $15,000; owner, Peter Marie; architect, D. Lienau; builder, John Banta.

Fifth Av., cor. 16th st., two-st'y brick extension, 45' x 36', also interior alterations; cost, $4,000; owner, Martinelli; builder, Joseph Smith.

Thirty-first St., No. 136 *East*, three-st'y brick extension on rear, 21' 8' x 22', new store front in basement story; cost, $3,500; owner and b'ldr, M. Brown.

CAFE.—The "White Elephant," on Broadway, between Thirty-first and Thirtieth Sts., is to be enlarged by the addition of a café.

FULTON MARKET. — Fulton Market has been condemned by the Inspector of Buildings as in an unsafe condition and dangerous to the limbs and lives of its occupants and of the persons who pass through. A bill has been introduced before the Legislature, providing for the rebuilding of the market by the Commissioner of Public Works, under the supervision of the Commissioners of the Sinking Fund. The bill was drafted by the Mayor and Controller of the City, and has been sent to Albany with a very strong memorial. It is expected that immediate action will be taken.

HOUSES.—*Fifty-fifth St.*, near Fifth Avenue, for Chas. F. Barney, Messrs. McKim, Mead and White; L. W. Crow, builder; two residences; one 33' x 95' 5"; one 17' x 68'; cost, $40,000 and $20,000, respectively; granite fronts.

MODEL BRICKYARD. — Messrs. Wilson Bros. & Co., have sent to Switzerland full plans for a model brickyard, embracing all the latest American improvements.

OPERA HOUSE.—The Board of Directors of the new Metropolitan Opera House have purchased from W. H. Vanderbilt the block between Madison and Vanderbilt Aves., extending from Forty-third to Forty-fourth St., for $300,000. The plot measures 189' x 210'.

STORES.—On *Twenty-seventh St.*, cor. of Broadway, a store is to be built from designs of Mr. James Stroud. It will be 26' x 80', of Philadelphia brick with Nova Scotia stone finish, five stories high; cost, $35,000; W. C. Hanfield is the owner.

No. 11 *West Nineteenth St.*, for Robert Goelet; George Mullian, architect; Marc Eidletz, builder; 20' x 77'. Iron front store; cost $15,000.

Philadelphia.

ALTERATIONS. — *Nos.* 707 *and* 709 *Wharton St.*, addition of two stories to pottery; owners and builders, J. E. Jeffords & Co.

Cor. Dock and Front Sts., addition to building, 30' x 60'.

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No. 214 *North Twenty-Second St.*, addition of three stories to building, 18′ x 26′; contractor, W. L. Atkinson.

Factories. — *Fifth St., cor. Lehigh Ave.*, two-story brick factory, 16′ x 32′; owner and builder, Jacob Marsch.

Sixteenth St., near McKean, one-story factory, 16′ 26′; owner and builder, K. Holloway.

Division St., cor. Thompson St., 1 two-story factory, 60′ x 120′; contractors, Rea & Riley.

No. 416 *Cherry St.*, 1 three-story shop, 18′ x 70′; builders, Messrs. Shegog & Quigley.

Church St., west of Hamilton and Wood Sts., one-story foundry, 50′ x 100′; owners and builders, Lindsay & Herndon.

Twenty-Third St., cor. Turner St., 1 machine shop and foundry, 40′ x 240′; contractors, Whiteside & Sons.

No. 1234 *Columbia Ave.*, 1 two-story bake-house, 19′ x 30′; owner and builder, G. W. Mosebach.

Houses. — *Cadwalada St.*, 1 three-story dwelling, 16′ x 39′; contractor, George Kessler.

Boston St., West Twenty-fourth and Twenty-Fifth Sts., 15 three-story dwellings, 14′ x 33′; J. L. Cane, owner.

Mill St., near Lime Kiln Pike, 1 two-story dwelling, 19′ x 36′; builders, McLaughlin & McNamara.

Cresson St., near Adams St., 1 three-story dwelling, 17′ x 35′; builders, same as above.

No. 807 *Buttonwood St.*, 1 three-story building, 17′ x 30′; contractor, James Girton.

Dudley St., between Ninth and Tenth Sts., 1 two-story dwelling, 16′ x 30; contractor, Henry Wisner.

Fifth St., 1 three-story dwelling, 18′ x 60′; contractor, Henry Hartzell.

Mt. Holly St., near Reed St., 2 two-story dwellings, 14′ x 28′; contractor, Thomas McCouch.

Mellville St., near Neff St;, 1 two-story dwelling, 18′ x 30′; Chas. Fay, contractor.

Thirty-Fourth St., cor. Baring St., 1 three-story brick dwelling, 18′ x 20′; Wm. Orr, contractor.

No. 1916 *South Fifth St.*, 1 two-story dwelling, 16′ x 40′; owner and builder, S. B. Snell.

Airy St., near Robinson St., 1 three-story dwelling, 21′ x 32′; contractor, John McAlarnen.

Franklin St., near Columbia Ave., 1 three-story dwelling; Whiteside & Sons, contractor.

East St., near Cresson St., 1 two-story store and dwelling, 17′ x 32′; contractors, Harmer & Gillet.

Leverington St., west of Ridge Ave., 4 two-story dwellings, 17′ x 44′; owner and builder, Jacob Shinkel.

Ruscomb St. and Germantown Road, 2 three-story dwellings, 16′ x 42′; owner and builder, Robert J. Siddall.

Hotel. — *Chestnut St.*, near Nineteenth St., 1 six-story hotel building, 25′ x 160′; architect, Addison Hutton; builders, Yamell & Cooper.

Stores. — *Main St.*, west of Seymour St., 1 two-story store, etc., 17′ x 52′; owner and builder, Charles Schimpff.

Second St., north of Diamond St., 1 three-story store, 18′ x 45′; contractor, L. A. Buckle.

Office Building. — *Thirteth St.*, cor. Chestnut St., 1 office building, two stories; contractor, John Godfrey.

Warehouse. — *Twenty-Eighth St.*, near Brown St., one-story warehouse, 20′ x 50′; owner and builder, William Charlton.

Stable. — *Jefferson St.*, near Seventh St., 1 three-story stable and dwelling, 14′ x 22′; owner and builder, George Mertz.

Railroad Depots. — Messrs. Wilson Bros. & Co. are preparing plans for alteration of the large freight depot of the P. R. R. Co., at 15 and 16 Market St., this city. The work on the new elevated railroad of the P. R. R. Co. is progressing rapidly.

St. Louis.

Building Permits. — Thirty-five permits have been issued since our last report, six of which are for frame structures of slight importance. Of the rest those worth $2.500 or over are as follows:

Owners Name.	Use.	Stories.	Rooms.	Cost.
Frazier Lubricating Co.,	F'ct'y,	2	2	$5,000
F. Stenniger,	Dwell.	2	12	4,500
Leider Krantz Co.,	Hall	2	3	30,000
M. Meckling,	Dwell.	2	10	3,800
Green & Clark,	Dwell.	2	10	7,000
Page and Grandser,	F'ct'y.	3	3	6,600
—— Peterson,	Dwell.	3	12	6,300

Strikes. — The stone cutters have been on a strike since April 1, 1880. It is understood that besides demanding increased pay they insist that the bosses shall employ none but stone-cutters to set stone, that they shall make a uniform rate of $3.00 a day for bad and good workmen alike, and that the bosses shall repair to the headquarters of the strikers, and there sign a paper of humiliation, confessing their sins and agreeing to the above and other conditions.

Several attempts at a strike have been made by carpenters and bricklayers, and also by laborers, but without general coöperation. The effect of the rise in price and the labor disturbances has been to check much proposed building, and the season will be comparatively dull.

General Notes.

Addison, N. Y. — Mr. E. B. Gregory, architect, of Elmira, N. Y., is building six stores, in one block, but different style of front to each; pressed brick fronts, with Ohio sandstone and limestone finish; also a post-office building for the following named gentlemen: post-office building, cost $5,000; one store, W. A. Smith, 25′ x 125′, cost $6,500; two stores, C. W. Gillet and A. Winton, 25′ x 85′, cost $8,000; one store C. W. Gillet, 25′ x 85′, cost $5,000; two stores, Payton & True, 25′ x 85′, cost $8,000.

Allentown, Pa. — Mr. Elias Bittner is about to build a four-st'y block, fronting on Hamilton St., and running back 125 feet.

Andover, Mass. — An English cottage is being built for the Andover Theological Seminary, to be occupied by Prof. W. J. Tucker; Merrill & Eaton, architects, Lowell, Mass.; Abbott & Jenkins, contractors, Andover, Mass; cost, $12,000.

Armerdale, Md. — The corner-stone of Father Jollin's church will be laid next Sunday.

Bluffton, Ind. — Mr. E. J. Hodgeson, of Indianapolis, is the architect of the house for Mr. J. S. Ball; cost, $4,500; also of a house for Mr. C. Warner; cost, $3,000.

Brewster, Mass. — The town has voted $10,000 for a town hall.

Brigantine Beach, N. J. — Congressman Harmer is building a cottage.

Brockton, Mass. — The Southworth House, on Main St., is to be removed, and a three-st'y brick block, 75′ x 225′, is to be built. It is to be built and owned by an association of seven gentlemen.

Charlemont, Mass. — The Methodists have the foundations laid for a new two-story parsonage.

Cleveland, O. — Mr. Ralph Worthington says that a new block is to be built in place of the one burned May 6.

Ground has been broken for the new Case Avenue Church.

Connersville, Ind. — A new house is to be built for J. G. Florea, from designs by E. J. Hodgeson, architect, of Indianapolis; cost, $8,000. Mr. Hodgeson is also the architect of the jail, which is to cost $7,000.

Corning, N. Y. — Mr. E. B. Gregory, architect, of Elmira, N. Y., is building a dwelling house for G. R. Brown, cost $3,500, and is repairing St. Mary's R. C. Church, at a cost of $5,800.

Corydon, Ia. — Mr. C. A. Dietrich is the architect of the school-house now building here; cost, $10,000.

Dayton, O. — A petition is in circulation, and will be sent to Congress, signed by four thousand of the veterans, asking for an appropriation of $30,000 to replace the Memorial Hall at the Soldiers' Home, which was lately burned. Contractors say that it can be rebuilt in sixty days.

Easthampton, Mass. — The library building committee have awarded the contract for the new building to Bartlett Bros., of Whately, for $16,000.

Elmira, N. Y. — Mr. E. B. Gregory, architect, is building a dwelling house for Seth X. Metzger, in Swiss villa style, cost $5,500; a stable for N. P. and J. S. Fassett, cost $5,500, and a stable for N. S. Winsor, cost $2,500.

Haydensville, Mass. — The Hayden Co. intends to build three double tenements this season.

Indianapolis, Ind. — Mr. C. A. Wallingford is the architect of the house for D. Randsell; cost, $6,000.

Mr. E. J. Hodgeson is the architect of the house for C. E. Coffin; cost, $4,000.

Ionia, Mich. — The recently burned district is to be built up at once by the heirs of the Moseman estate.

Jermyn, Pa. — The Catholic Society is building St. Patrick's Orphan Asylum. A frame building, 40′ x 50′; Fred J, Amsden, of Scranton, architect.

Jobstown, N. J. — The corner-stone of a new Catholic church was laid May 6.

Lafayette, Ind. — Mr. C. A. Wallingford, architect, of Indianapolis, is to build a house for J. J. Perrin.

London, Ont. — Messrs. Tracy & Durrand are to be the architects of the Masonic Temple, which is to be built at the corner of Richmond and King streets, at a cost of $70,000.

Louisville, Ky. — Hale & Bro. are to build two two-and-a-half-story brick dwellings on Breckenridge St., between Fifth and Sixth; cost, $3,500 each.

F. Burnett is to build a two-and-a-half-story brick dwelling on Jefferson St., between Hancock and Jackson; cost, $1,200.

Thomas Meikle is to build an addition to a three-story brick warehouse on Monroe St., between Eleventh and Twelfth; cost, $3,000.

Lowell, Mass. — The city is advertising for plans for a two-story school-house, to cost $7,000.

Martinsville, Ind. — An $8,000 house is building for M. E. Park, from the designs of E. J. Hodgeson, architect, of Indianapolis.

Middletown, Conn. — The new building for the Farmers and Mechanics' bank, to be built this summer will cost $80,000.

Milton, Mass. — Mr. George Chickering's house is being altered from designs of Mr. E. A. P. Newcomb, architect, of Boston. A stable is also building; Burt Bros., builders.

Newton, Pa. — There is being built here, at Hill Side Farm, a building for the Insane of Scranton Poor District; size 45′ x 50′, two stories and basement, and of brick. Plans by Mr. Fred J. Amsden.

Newtonville, Mass. — Mr. E. A. P. Newcomb, of Boston, is the architect for rebuilding Mr. Wm. Holling's house in the Queen Anne style,

Norwich, Conn. — The First Society will soon begin building a new church.

Pittston, Pa. — Mr. A. McI. De Witt is about to build a frame house, costing about $8,000, from plans by Mr. J. H. W. Hawkins, of Wilkesbarre, Pa.

Scituate, Mass. — The corner-stone of the new Unitarian church, which is to be 41′ x 70′, was laid on Monday last.

Scranton, Pa. — Mrs. Marvine is building a brick block on Lackawanna Ave. and Washington St., 108′ x 85′, three stories high, to be occupied by Hunt Bros. & Co., for a handsome store; cost, $10,000; Fred J. Amsden, of this city, architect.

Mr. James Jordan is building a block on Lackawanna Ave., of pressed brick, three stories, 37½′ x 80′; cost, 10,000; Fred J. Amsden, architect.

Tewkesbury, Mass. — Drawings are nearly completed for an English cottage and stable for Mr. William E. Whitehead, to cost about $12,000; Otis A. Merrill, architect, Lowell, Mass.

Tioga, Pa. — Mr. E. B. Gregory, architect, Elmira, N. Y., is building St. Johns R. C. Church; cost, $6,500.

Waltham, Mass. — The town will build a new school-house, costing $20,000.

Wilkesbarre, Pa. — A Jewish Synagogue is about to be built on Washington St., size 38′ x 75′, of pressed brick and stone finish; cost about $10,000. Mr. J. H. W. Hawkins, of this city, architect.

Mr. A. T. McClintock is building a brick residence on Franklin St., costing about $15,000.

Mr. R. J. Flick is building a brick block of five houses, on South St., costing about $20,000. Mr. Hawkins, architect.

Mr. Benjamin Reynolds is remodeling a house on River St., costing $6,000, from plans by J. H. W. Hawkins.

Mr. Espey is building a three-st'y brick block.

Woonsocket, R. I. — James Helme has begun a new block, 40′ x 60′, at the corner of Prospect and School Sts.

Industrial.

Auburn, Me. — L. B. Kinsley & Co. will add about thirty feet to their factory and put a French roof on the whole.

Chicago, Ill. — Messrs. Jones & Laughlin will build one of the largest nail factories in the West, fronting 268 feet on Canal, and 150 on West Lake.

Chicopee Falls, Mass. — J. Stevens & Co., have commenced a building nearly as large as their main shop.

Colerain, Mass. — W. Cary Jr. is putting up a three-story building for the manufacture of cider vinegar.

Guilford, Conn. — H. K. Thurber of New York, will build a new canning factory, 150′ x 36′.

Ipswich, Mass. — A large addition, 280 feet long, 85 feet wide, and four stories high, will be immediately made to the Ipswich hosiery mills.

Long Beach (Long Island), N. Y. — The Atlantic and Virginia Fertilizer Company will rebuild their works.

Lowell, Mass. — Otis A. Merrill, architect, is furnishing the drawings for the new mill of the Middlesex Company, of this city. When completed it will be 428′ long, 55′ wide, and two wings 55′ x 80′ each; the main mill to be five stories high, the wings two stories each.

Paterson, N. J. — J. C. Todd & Co. are building a four-story addition to their flax mill.

Richmond, Mich. — A flax-mill is shortly to be built here.

South Lawn, Ill. — A large plow factory, involving the expenditure of $150,000, is building at South Lawn, near Chicago, to be ready for work by August 1, by the Hopkins Reaper Company.

Trenton, N. J. — A large woollen mill is being built by Samuel K. Wilson.

West Warren Mass. — The Warren Cotton Company has commenced its new mill, which is to be a two-st'y structure, and will cover about a half acre of ground.

Bids and Contracts.

Albany, N. Y. — The contract for the sawed slate bedplates for the iron rafters of the new government building has been awarded to the North Peach Bottom Slate Company, of Philadelphia.

Allentown, Pa. — The Southerland Falls Marble Co., has been awarded the contract for marble for front of Vermont, of Elias Bittner's block.

Boston, Mass. — The Directors for Public Institutions have awarded to Weston & Shepard, $15,133, the contract for building a laundry building for the House of Correction at South Boston. The other bids were as follows: Donahue Brothers, $17,000; Augustus Lothrop, $16,600; B. F. Dewing, $16,172; J. W. Coburn & Co., $15,993; James Fagan, $15,477; McGorragie & Co., $15,475.

Awards of contracts for building material of the third story of the Post-office and Sub-Treasury Building extension, in this city, have been made as follows: Hard-burned brick, to Bay State Brick Company, at $9 per 1,000; cement, to T. W. Hoxie & Co., at $1.24 per barrel; lime, to D. Roby & Co., at 88 cents per barrel, and sand to P. O'Riorden, at $1.97 per square yard.

The contract for furnishing tiles of Italian marble for the New English High and Latin School building has been awarded to Bowker & Torrey, for $,9834.

Camden, N. J. — Messrs. Cofrodl & Sayler, of Philapelphia, have the contract for building the new Union depot.

New York, N. Y. — The contract for the new building for the Bank of the Republic and First National Bank has been awarded to Mr. R. L. Darragh, at a sum in the neighborhood of $375,000.

North Adams, Mass. — The Michigan School Furniture Company have contracted for seating the new Baptist church for about $1,400.

Pittsburgh, Pa. — The contracts for building the new Power Hall, Pittsburgh, which will be 100′ x 167′, and the annex to Floral Hall, 30′ x 126′, were awarded to William Anshutz.

Springfield, Ill. — The contract for building an addition to the Illinois Watch Factory, 30′ x 100′, three-stories high, has been awarded to John T. Rhodes & Bro., for $10,000; J. C. Cochrane, Chicago, architect.

Public Buildings.

The House Committee on Public Buildings and Grounds has already agreed upon bills authorizing new public buildings in thirty-seven cities. In Northern cities sixteen buildings are authorized, the aggregate cost of which is limited to $3,500,000. In Southern cities and towns twenty-one buildings are to be provided, at a total cost of $2,200,000.

Danville, Va. — The site for a new custom-house has been fixed on.

Fort Wayne, Ind. — Mr. Colerick has introduced a bill directing the Secretary of the Treasury to purchase a site and erect a building for a Post-Office, Court House, Revenue and other offices, at a cost not to exceed $50,000.

Frankfort, Ky. — The House Committee on Public Buildings and Grounds, has agreed to report an appropriation of $100,000 for a Court-House and Post-Office building.

Leavenworth, Kan. — The House Committee on Public Buildings and Grounds has agreed to report a bill making appropriation for a Public Building not to exceed $100,000.

Marquette, Mich. — The House Committee on Public Buildings and Grounds, has reported a bill to build a U. S. Court House and Post-Office.

Pittsburgh, Pa. — Mr. Shallenberger has secured the passage of the bill for the erection of a Public Building here.

It is said that plans are already preparing for the new Custom House.

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AN illustration of the way in which the operations and interests of insurance companies influence building operations in certain cases is found in a recent occurrence in New York. A large church in Harlem was burned some three months ago, the walls only being left standing. The property was valued at eighty-five thousand dollars, and insured in various companies for forty thousand dollars, which, it was estimated, would not cover the loss by several thousand dollars. It happened, however, that the parish was known to have been dissatisfied with its church building, and moreover a price had been offered for the land on which it stood so large that another equally eligible lot could be bought with the proceeds, a more satisfactory church built, and yet leave a surplus of money. The insurance companies, as one of the authorities alleges, knowing this, attempted a sharp trick. Instead of paying over the amount of the policies, they professed to be about to avail themselves of the option which all policies give, to rebuild the burnt structure instead of paying the insurance, in the hope that the parish, rather than see their inconvenient church rebuilt on a site which they would prefer to see vacant, would abate a portion of their claim. The church authorities, finding that it would cost the companies some sixty-five thousand dollars to rebuild, felt very naturally that their position was a strong one, and declined to take any less insurance than the sum they had contracted and paid for. Accordingly the companies have set about the construction, with all their interests, as they suppose, in favor of doing the work as cheaply as possible, while the church authorities look on, keeping a sharp watch to see that the construction of their new edifice is not so outrageously bad as to come under the penalties of the law.

THIS interesting spectacle is further diversified by the connection with it of the Department of Buildings. It appears that immediately after the fire the parish authorities, in order to present an authenticated statement of their loss to the underwriters, applied to the Department for permission to rebuild the church, using the walls which still stood. After inspection, this permission was refused, and it was ordered that a large part of the walls should be taken down. A special survey, made by a mason, an architect, and the Superintendent of Buildings, unanimously confirmed this judgment, and the walls were ordered to be torn down. After the insurance companies had undertaken to rebuild the structure, permission for which was granted on condition that the condemned walls should be taken down, another inspection was ordered, by a new set of deputies, who concluded that it would be safe to use the old walls as they stood. The point which seems to make the most impression on outsiders is that the architect who was a member of the first survey, which condemned the walls, was subsequently commissioned as architect of the church by the insurance companies, and it certainly is a little singular to see the same walls which he had himself condemned in concurrence with the Department afterwards pronounced safe by the same Department on the application of those who had become his employers. Although it is to be regretted that anything should occur so likely to occasion unfavorable comment, we should not be too hasty in attributing bad faith to any one. After all, the "coëfficient of safety" is a very arbitrary matter, and the best of architects or inspectors might condemn a wall which had only four times the strength requisite to resist the strain upon it, if he supposed that it would be no injury to any one to have it taken down; while he might conscientiously think that to be an ample margin for safety if he subsequently found that important interests required that it should be allowed to stand.

MANY of our readers have doubtless received copies of the instructions to architects intending to compete for the new public buildings at Toronto, and will be interested in a circular sent out by a number of the profession in the Province of Ontario, who are naturally the first to act in the matter, addressed to their fellow architects, and requesting signatures to a paper addressed to the Commissioner of Public Works. We reproduce both these documents in another column. On the whole, the terms of competition had appeared to us much fairer than usual. A very large amount of work was required of competitors, far too large to make it worth while for architects in very extensive practice to enter the lists, and much of it unnecessary, as, for instance, the stipulation that the material should be distinguished on the eighth-scale plans and sections, which would require an immense amount of minute picking out of cut-stone, rubble, brickwork and furring of no use to any one, since no contractor would pay any attention to such microscopic indications; and such details in the specifications as the sizes of steam-pipes, which every heating contractor would have a different rule for. The "itemized estimates of quantities and cost" would also involve much useless labor. Every architect knows that the most elaborate schedules of quantities do not prevent contractors' tenders from varying a hundred per cent or more, and that their approximate estimates made by cubing the contents, with a knowledge of some nearly similar constructions to guide them, are, if carefully made, usually pretty near the actual cost, while quantities ignorantly drawn or intentionally falsified might be fatally misleading. The competition of rates between architects we were sorry to see proposed, but competitors of any capacity would so quickly see the folly of advertising themselves as second-rate by offering to do the work for less than the usual commission that the matter did not seem serious. However, we should be glad to see a recognition on the part of the Government that cheap experts are the dearest of all public servants. As to the extension of time, we might suggest as a compromise that sketch plans only, in pencil perhaps, at a sixteenth-scale, might be called for at once, and a selected number, say twenty, out of these should be notified to prepare more detailed plans, for which a longer time would be given. This would save the collective profession from a vast amount of needless labor and expenditure, and would, we think, secure a better class of competitors.

MANY of our readers have been interested in Mr. Edward Atkinson's suggestion, made shortly after the destruction of the Cathedral Building, in the centre of the richest part of Boston, by which this and the neighboring districts could be efficiently protected against the fires which prove so unmanageable in high buildings filled with inflammable goods, by means of stand-pipes and ladders, enabling the firemen to work efficiently and promptly. The details of the system were well thought out, and the description of it received much attention in many places. The cost of complete apparatus, ready for service, was estimated at sixteen hundred dollars per acre, and Mr. Atkinson reckoned the area covered by high buildings needing such protection in Boston to be not over fifty acres. The cost of fitting up the whole exposed district would then be eighty thousand dollars, and a hundred million dollars' worth of property would be at least partially protected. However, eighty thousand dollars seemed to the insurers a large sum; still larger did it appear to the owners of the property, who all had policies in their safes covering, as they supposed, any probability of loss, and so nothing was done except to speak approvingly in conversation of the project, and hope it might some time be realized. Fortune, after waiting four months for something besides talk on the subject, administered lately another severe lesson in the fire in the Beebe Building, within a few

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rods of the ruins of the fire of December last. With the usual delay for bringing ladders, putting them up outside, and hauling hand-hose with great labor to a spot which with stand-pipes could have been reached in thirty seconds after the first fireman entered the building, the blaze was subdued, but thousands of dollars' worth of property had perished. The insurance companies are now putting their hands in their pockets for their contributions to make up this loss to the owners, pondering meanwhile how they can raise rates so as to make the same owners pay it all back to them in the next year or two. To neither of them does it seem to occur that the interest on the value of the property destroyed would, if properly applied, in four years make such enormous losses impossible for the future.

We have received, by the courtesy of the Secretary of the National Board of Fire Underwriters, the printed reports presented to the late meeting of that body by various committees. Among others is the report of the Committee on the Form of Policy, which contains a new form, recently adopted by the New York Board, presenting it not as a model, but with the remark that a demand for a shorter form of policy having undoubtedly arisen, the New York form offered some suggestions on that point. Those who have strained their eyes over the microscopic print of ordinary policies to find out definitely to what their premiums entitled them will remember several points which the new policy treats in a different manner, and, as a rule, much more favorably to the policy holder. The troublesome stipulation that the working of mechanics in dwelling houses for more than five days in a year, or in other buildings for any length of time, without the written consent of the insurers, should vitiate the policy, is changed so as to allow the operations of mechanics without notice for fifteen days in a year, in any building. Plate-glass and frescoed decorations, and printed books, which were formerly not insured with a building, are now covered by the same policy. A new clause is inserted, to the effect that no constructive loss beyond the actual damage by fire to the property shall be covered by the policy. This refers to the requirements of most building laws, that structures erected before such statutes were in force, must, in case of total or nearly total destruction by fire, be rebuilt, not as they were before, but in accordance with the existing laws. This is an important matter; in New York especially, where the difference in cost between the actual and the lawful construction of many buildings would amount to thousands of dollars; and owners of such buildings should know that their new policies cover only the value of the actual illegal construction, leaving them to pay the additional cost of compliance with the law out of their own pockets.

We should like to see an attempt made to draft a satisfactory policy of insurance to cover buildings in process of construction. It is easy enough for the owner to insure his interest, but he has no interest in the building until he has made a payment to the contractor, and then only to the amount of such payments. In order that all the loss by a fire may be covered, the builder must also insure his interest, which varies as the work goes on, by a separate policy, and the architect or owner has sometimes to look sharply to see that he does this, for it is not impossible that a builder, supposing that the owner's policy covered all the interests, or too ignorant or careless to protect his own, may be thrown into bankruptcy by a fire, to the injury both of himself and of the other party to the contract, who has to make a new agreement to rebuild the structure, generally on less favorable terms. We have known policies covering the whole loss to be made payable to the architect, in order that he might apportion the loss between the parties, but this throws on him a new and serious responsibitity; and contracts sometimes require that both interests shall be separately insured, the architect making sure that this is done by keeping the policies, which is better, but still rather a cumbrous proceeding. A simple and intelligible policy for such cases would meet with great favor from architects and builders.

One stipulation which is frequently made in insurance policies, although perhaps not much insisted on by the companies, seems to us manifestly unfair. This is the clause providing that the policy shall be vitiated unless the building on which it is taken is provided with "good and substantial stone or brick chimneys, the absence of which has been the cause of the fire." Whether the existence of the "defective flues" to which a very great proportion of fires are due, might not be taken as evidence that the chimney to which they belong is not "good and substantial," might some time be a serious question, if the underwriters, alarmed at the increasing proportion of losses, should begin to look more sharply after excuses for avoiding their obligations. In point of fact, not one policy holder in a hundred knows anything about the condition of the chimneys in the buildings he has had insured. Even if he is the occupant, he cannot tell what may be the condition of things behind the furrings of the chimneys, while if his interest is simply that of a mortgagee, all the chimneys may, for aught he knows, be built on top of the roof. A proper inspection by experienced agents of the companies could determine all these points, to the great ultimate advantage both of underwriters and owners, and it seems only fair that the acceptance of a premium by a company should be taken as indisputable evidence that the risk was actually such as the policy represented it to be.

The Council of the Royal Institute of British Architects, in their annual report, present the scheme for the examination which it is proposed to make compulsory on all candidates for membership after May, 1882. We print the scheme at length in another place. It has already excited much discussion among the English architects, but its reception has been very favorable. It is unquestionable that a strong public feeling exists in favor of doing something to sift out trained professional men from the untrained, and mark them so that they can be recognized, and this demand grows more and more urgent with each such manifestation of the disastrous effects of incompetency as the fall of the Madison Square Garden, the burning alive of a theatre audience, or the failure of a railroad bridge, but it is not easy to find a method of accomplishing this desirable end. Much as professional men suffer from ignorant pretenders, who not only compete for their business by questionable means, but bring disgrace upon the whole body by their malpractices, they are deterred by a creditable sentiment from promoting anything which might injure the least worthy of those who call themselves their fellows; while the public is disinclined to interfere in the private affairs of a profession, however much it may suffer from the misdeeds of a portion of it. In this state of affairs, the formation of a body of practitioners into which none can enter except those who prove themselves, by examination, adequately trained in the art which they profess has come to be accepted as the best resource. Such an examination does no injustice to those who cannot or will not pass it; no slur is cast upon them, and the public is left free to employ them if it wishes; but those who have earned by hard labor the right to stand among others of eminent acquirement are given an opportunity to claim that right, and to be recognized as having attained it. In setting the time for the first examination two years hence, the English architects afford ample opportunity for all now in the profession to qualify themselves for its honors, and give public notice to intending applicants of the standard which they must attain, so that no one who wishes to reach the standing in his business which membership in the Institute will confer need fail, unless by his own incapacity or slothfulness. We hope before long to see a similar condition for admission established in our own national and local architectural societies. Not only would the public and the profession profit by the institution of public tests of competency, but the societies would gain an immense increase of prestige and influence, as soon as it became known that they had that to dispense which it cost an effort to obtain.

The Berlin architects some time ago did a judicious thing, which might well be imitated elsewhere. A large brewery had been built near the centre of the town, and, the proprietors falling into financial difficulty, the building was sold off at a great sacrifice. The Association of Berlin Architects, which includes also the engineering profession in the capital, by making an effort succeeded in purchasing the structure, and fitted up the large space thus obtained to suit their own purposes. The house so transformed has become a general resort of the members. Social entertainments are given in the great apartments, and public lectures are delivered there, while students and amateurs pursue artistic or technical courses in their special quarter, and there is still space left for all the conveniences and attractions of a club, separate from the rest. Among us, architects come in contact with artists on one side as muchas with engineers on the other, and an association which included all three professions would have a good chance of being harmonious and useful.

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OLYMPIA.[1] — I.

THE folio volume embodying the results of the third season of the excavations at Olympia, or, as the Germans delight in terming it, their third campaign, — 1877 to 1878, — has recently been published. Its illustrations, like those of the preceding annual reports, consist of heliotype-photographs which show the landscape of the excavations and the objects of greatest value found: principally fragments of sculpture. These are supplemented by a topographical map, by restorations of the gable-groups, and by architectural plates, — the latter being in this volume especially numerous and interesting. The elegantly printed text consists of the short official introduction of Dr. Curtius, descriptions of the objects represented, with notes upon the plans of the buildings. It contains also an essay by Dr. Treu upon the restoration of the western gable-group, or rather the attempt to place the fragments of the figures in relative position. The price of this third publication, in a portfolio .38 m. by .49 m., is ninety marks; that of its predecessors was thirty-six and fifty marks respectively, the difference being explained by the increased number of plates.

In the meantime the fourth season of the excavations is over, and the fifth, probably the last, draws to its close with the approaching warm weather. The fourth volume, officially promised (by Adler in No. 63 of the *Deutsche Bauzeitung*, 1879) for last January has not appeared. It is now rumored that it may be delayed so long as finally to be united with the fifth year's report,— instead of having been published at the same time as the volume now before us, as it might. It is true that it will be decades before the enormous amount of material which has already come to light can be fully appreciated and absorbed, as it were, by the various branches of science which are thereby enriched. Some idea of the quantity of antiquities unearthed, up to the end of the fourth season, may be obtained from the numbers of the objects they catalogue. The fragments of sculpture amount to 1,328, of bronzes 7,464, of terra-cotta 2,094; there are mentioned 696 inscriptions, 2,935 coins, and 105 various articles, — glass, horn, lead and the like. Three peripteral temples and numerous other important buildings have been laid bare for investigation, and the great question of the topography of the Altis, the sacred enclosure, is decided in its main bearings. Food for reflection has thus certainly been already given; but on the other hand it is disappointing that results, which have been made known one by one in scattered numbers of the *Archæologische Zeitung*, where each individual discovery of importance is immediately mentioned, should await collection and publication with illustrations for nearly two years after the time when all the facts and photographic views were in the hands of the editors.

The two former volumes, which showed the state of the work up to the summer of 1877, were referred to in a notice in No. 120 of the *American Architect*. At that time the great temple of Zeus, superficially touched upon by one of Blouet's trial-pits, fifty years ago, had been almost uncovered, the Heraion and the Exedra of Herodes Atticus had been found, the paved place before the great temple had yielded much of the eastern and some part of the western gable-groups, and two of the grandest works of ancient sculpture known had been discovered: the Nike of Paionios and the Hermes of Praxiteles, the latter in May, 1877, too late for publication in the second volume. The work of the third season began about the first of October, 1877, and closed when the heat of the next June rendered continuance impracticable. The number of workmen was increased until in the late spring three hundred were simultaneously employed. A detail of the excavation was the great increase in the use of horse-carts which carried the earth from the trenches to throw it into the former bed of the Alpheios, where all traces of antiquity have been washed away by its waters. The wheel-barrows, which during the first year had removed the débris from the site of the great temple, through the two short southern trenches, could not suffice when the digging was removed one hundred metres farther north to the foot of Mount Cronion, directly away from the spot where the displaced earth was deposited. This season, attention was especially directed to thoroughly clearing the southern side of the great temple and continuing with the removal of the land slidden from the hill upon the northern edge of the Altis, where the Heraion, the Exedra and several treasure-houses were known to exist. Work was commenced at the great temple, the earth being dug away for a distance of fifty metres to the west and half as far to the south. Here a number of fragments of figures of the western gable were found: the nymph of the southern corner, the torso of the central figure, and other pieces which allow a reconstruction of the great composition, now quite easily understood from the double plate 26–27 which shows the remains in relative position. The group has a direct architectural importance as well as archæological and sculptural interest. A large part of this third report is devoted to its consideration. The subject typified was the combat of the Lapithæ with the Centaurs at the wedding of Peirithoos. This agrees with the statement of Pausanias,[2] who further attributes the work to Alcamenes, the most celebrated scholar and emulator of Phidias. The authorship of the works of sculpture recognized as belonging to the western gable has been attributed without further question to Alcamenes on the strength of this testimony. Yet no one can claim to see in the gable-groups of the Olympian temple the slightest dependency upon the art of Phidias. They rather seem to belong to a stage of development preceding his age, even as the architecture of the temple is evidently of an earlier period than that of the chief buildings of the Athenian acropolis. There are facts which strengthen this view, but this is not the place to discuss a question which has not hitherto been opened. The reconstruction of the composition was effected from nearly a thousand fragments, represented in Berlin by plaster-casts. The fact of the almost formless blocks appertaining at all to the temple was often recognized alone by their position when discovered. They were fitted together after long study in a large room in the museum of Campo Santo; the inclination of the temple gable being there represented by a triangular wooden frame, into which the arrangement was fitted. Though the result was not so positive as to put it beyond the influence of future discoveries, it at least presents the principal lines and masses of the composition. The chief motive, the seven figures in the middle of the gable, is surely known. The bodies of the two Centaurs with the women whom they have seized, being seen in full side-view, give broad masses of light to the central part of the composition, where the height of the triangle is greatest. Rising above them is the chief figure, well outlined against the shade cast by the bodies of the Centaurs upon the wall-veil of the tympanum. The powerful action of the groups at either side tends upwards with the line of the gable corona to the quiet and supreme deity. The position of the seven figures was determined by a combination of facts recognized during the attempts to reconstruct the composition in Berlin. The principal group of each wing, separated by two figures from those in the centre, consists of a Centaur, overthrown by the sword-thrust of a Lapith, yet still grasping the woman he had seized at the outstart. That upon the southern side is the better preserved of the two; a separate plate, 28, upon a larger scale than that of the entire gable, is devoted to its three figures which act a separate episode in the great struggle represented. The two figures between this side group and that of the centre are a Centaur and his prize — seen in face and coming forwards, as it were, from the tympanum surface. In this case those to the north are the most perfect: the arm of the youthful Thessalian encircles the neck of the Centaur who bites forcibly and brutally into the wrist. The figures which remain in each corner of the triangle are less certain in situation and action than those nearer the centre. Forming as they do with the adjoining figure of the Lapith who attacks the Centaur a triple repetition of a position with the trunk inclined far forwards, they seem less favorable to the general composition. But the somewhat monotonous line of the torsos may have been much altered by the action of the extremities, found in fragments insufficient to show their direction. The bodies fill the shade well out with broad masses in the corners of the composition, where a void would be especially felt, and they prepare for the first great break above the backs of the Centaurs, accenting the line which leads to the dominant centre. The figures in the extreme corners of the gable are characteristically marked for their position by an almost excessive triangularity. Those next to them seem to have reclined upon a couch, perhaps introduced as furniture of the room in which the wedding was being celebrated. It is evident from several considerations that some support was placed beneath the bodies. If not thus elevated they would hardly have reached the height of the corner figures. The under side of the marble was carefully worked in reference to being seen from below, which was only possible when artificially raised above the broadly projecting surface of the entablature corona. The figures were anchored to the wall behind, — not the case with those next them, and not necessary if they had lain like these, directly upon the cornice. Finally the fragments of a cushion or of some object covered with drapery were discovered among the remains of the western gable, close to one of the figures in question and probably part of the support beneath it. The pieces are represented upon Plate 16, and upon several side views of the double plate 26–27. The introduction of such a motive into the gable is particularly interesting. The arguments to prove that the figures thus elevated did not belong at all to the gable-group, based upon somewhat dissimilar workmanship and the different material, — they alone are Pentelic marble while the rest are Parian, — appear to be successfully refuted by Dr. Treu in his preface to the publication. He points to their position in the arrangement of the whole, to the fact that they complete the number of figures to the twenty-one of the eastern gable, to their style, which agrees perfectly with those beside them, and to the condition of the back of the stone, where are seen the dowel-holes that were necessary in clamping them to an upright surface. Opinions vary as to the significance of the majestic figure in the centre of the composition. Dr. Treu upholds the testimony of Pausanias as showing it to have been Peirithoos. The direct part taken in the struggle, the right arm, according to the view of Dr. Treu, holding the Centaur back, would seem incompatible with the character of a deity. On the other hand the conception that the figure represents Apollo, favorable to the Lapithæ who were directly descended from him, agrees far better with the mighty presence and the position of the body and with the archaic character of the head, recognizable at the first glance as a representation of that god. If any action at all is taken in the combat it is very slight, and must be looked upon more as a divine than as a physical interference. The outstretched arm is quiet, and seems more to protect the bride, Deidameia, than to struggle with the rampant Centaur Eurytion. The torso is upright, the drapery rests undisturbed upon the left arm; the entire position is composed and supreme. The far greater size of the Apollo renders the superhuman character still more evident. Its dimensions are only comparable to those of the reclining figures

[1] Die Ausgrabungen zu Olympia. III. Uebersicht der Arbeiten und Funde vom Winter und Fruehjahr, 1877-1878. XXXVIII Tafeln, herausgegeben von E. Curtius, F. Adler und G. Treu. Berlin: Verlag von Ernst Wasmuth, 1879.

[2] Paus. V. 10. 8.

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in the extreme corners of the gable, apparently nymphs of the locality where the wedding took place (of the Olympian valley, Dr. Treu says), corresponding to the stolid representatives of the Alpheios and Cladeos, which look upon the preparation for the chariot-race of Pelops and Oinomaos in the front gable. If the central figure and those upon either extremity of the composition be considered as superhuman, and the writer would argue in favor of this interpretation, the gable would be filled, like that of the eastern front, with three divinities in similar position and with eighteen mortal figures: in this case six Lapithæ, six Centaurs, and six women. The statues K and M of the plate 26–27 would be the bride Deidameia and the maiden mentioned by Pausanias, as they are recognized by Dr. Treu; the Lapith H, who struggles with the Centaur Eurytion I, would, however, be Peirithoos — certainly a more worthy pendant to the Theseus O of the corresponding group than would be Caineus, which the publication announces as the figure H. As to the decided testimony of Pausanias, who reports so trustworthily what was told him concerning the antiquities, it would not be strange if at his time, some six centuries after the creation of the work, he had been wrongly informed by his guide. The mistake of placing Peirithoos in the chief place of this representation of the combat would be natural, and every one knows how often the signification of a figure in a monumental composition is misinterpreted by professional *ciceroni*. The analogy of the gable-groups of the Parthenon, the temple of Ægina, and above all of the eastern front of this Olympian temple itself, would certainly make it probable that the figure of the deity presided over the combat. The beauty of the general design in its strictly symmetrical and yet agreeably varied action, in its masterly treatment of lines and masses, is peculiarly architectural. The gables of Olympia, because so much better preserved than those of the Parthenon, and of an arrangement more surely known than those of Ægina, are perhaps the most instructive to our profession of all compositions of sculpture existing. Though there may be room for doubt whether these figures belong to the age, to the school itself, of Phidias, and were worked by the hands of Paionios and Alcamenes, it still is hardly possible to speak with too great enthusiasm of the grandeur and dignity of the groups — fitted by a sacred calm for the eastern front of the great temple, where the festal processions passed the bronze tracery of the pronaos, as well as by life and energy for the rear, the freer field for pictorial ornament above the open epinaos. The incomparable application of sculpture to architecture, everywhere characteristic of the Greeks, is particularly instructive in the ruins which have been uncovered at Olympia. The problem is treated with equal power whether the gable-groups, the metopes and the reliefs of the buildings, or the more direct figural decorations of the numerous paved places of the Altis, be considered. Even when the statues have disappeared, the positions of the pedestals often suffice to display the admirable wisdom of their arrangement.

During the first work of the season, near the southwestern corner of the temple of Zeus remarkable archaic works of bronze were found, — the head of a statue with pointed beard (Plate 22), and curious reliefs, Heracles shooting a Centaur with a bow, and a winged female figure, apparently Artemis, grasping two lions by the hind legs (Plate 23). A peculiarity of the Centaur here is that the front legs and body are human, as Pausanias describes those upon the coffer of Cypselos, where there was also a representation of the archer Heracles in similar action.[1] From the vicinity of the temple several trenches were driven to gain an oversight of the remaining parts of the Altis. One of these struck, about fifty metres north of the stylobate, upon foundations which are supposed to be of the chief altar for burnt sacrifices, as they were in the midst of a layer of ashes from a metre to a metre and a half thick, among which were quantities of terra-cotta and bronze *figurini*. From the Heraion the works proceeded westwards, meeting with the remains of a circular peripteral building, recognized as the Philippeion, and, farther on towards the Cladeos, an immense square with peristyle and surrounding chambers. The latter, the most extensive of the buildings yet discovered, was first held to be the Prytaneion, but is published as the smaller Gymnasion and Palæstra. To the east of the Heraion, passing the Exedra of Herodes Atticus, excavated in the previous season, the workmen uncovered the numerous treasure-houses which stood at the foot of the hill. This occupied the forces of the excavators until spring. Afterwards the lower terraces with the bases of the sixteen figures of Zeus, the so-called Zanes, erected from the Olympic fines demanded from those who knowingly infringed upon laws governing the games, were examined. At their west was the third peripteral Doric temple of the Altis, the Metroön; at the east the subterranean entrance to the Stadion was discovered, a passage barrel-vaulted with wedge-cut stones, through which the contestants came into the space crowded with spectators. The northern half of the Altis, from the Gymnasion next the river to the Stadion at the foot of Mount Cronion, is thus quite thoroughly known.

No small part of the remains of antiquity was gained by overthrowing the walls which had been constructed in the Olympian plain after all understanding of the principles of antique architecture had been lost, and the carved blocks of earlier buildings, inscribed tablets, and even works of sculpture, were looked upon simply as raw material. It is only to be regretted that more fragments were not thus preserved. Too many marbles must have found their way into the lime-kiln which supplied the mortar so freely used for these clumsy walls. The Christian buildings of Olympia are of two classes, — the stone structures of the earlier Byzantines, many of which were built immediately adjoining the great temple, before this was overthrown by the earthquake, and the miserable peasant hovels of another period and another race, called in the reports of the excavators Slavonic walls, for the sake of a comprehensive term. The rectangular fortress of the Byzantines, connected with the temple, was an enormous structure; the walls, often three metres thick, were composed of fragments of every kind, which had been overthrown at the time of its erection. It may be judged from its dimensions — the northern wall being three hundred metres in length—how much there was preserved. The Slavonic walls, though they stand upon antique foundations, embodied few blocks carved by the Greeks. At the time of their erection all the buildings of the Altis were totally ruined, and many buried under heaps of rubbish. The bits of marble which were again used at this period are so fragmentary and boulder-like as to be of little value.

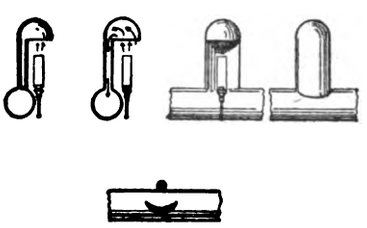
It may be seen from a glance at the topographical plan that as many works of sculpture as those which repaid the labor of the first years could not be expected to be found in the third season. The greater part of the gable-groups of the temple of Zeus lay in the position to which they had fallen when overthrown. The fragments which had been dragged about were all that further excavation could add to these principal compositions. Yet such supplementary fragments are of the most decisive importance. Every stone found which belongs to the gables is readily brought into position, now that the great problem of their general arrangement has been solved.

J. T. C.

[1] Paus. V., 19, 7 and 9.

VENTILATION OF GAS-BURNERS.[2] — II.

The Faraday Gas-Ventilator (Figs. 158-161) is said to be open to the objection that the draught is liable to be irregular and the chimney to become blackened with smoke. Though with careful construction and management both of these objections might be obviated, yet where the chance of this is great, other forms should be adopted. For the footlights of theatres a ventilator constructed as in Figs. 172 to 176 might be practicable. In this the footlight-screen and ventilator are combined. Fig. 172 gives a side view of the device, and Fig. 173 a vertical section, showing in both cases a section of the large horizontal ventilating-flue connecting the several branch ventilators together and passing along at the foot of the lights, partially screening them from the audience.



Figs. 172 — 176.

Fig. 174 gives a view as seen from the stage, and Fig. 175 as seen from the auditorium. In both cases a side view of the main flue is given. A horizontal section is shown in Fig. 176. The main flue should, of course, be large enough to carry off the products of combustion from the entire circuit of lights. Each branch-ventilator should be quite small, — only enough, and no more than enough, to serve for its own burner. A gas-jet burning in the perpendicular portion of the main flue would create sufficient initiatory draught therein, and should be lighted with or before the footlights.

The fatigue experienced at and after a late evening party is largely due to the impurity of the air of the ball-room. A dozen unventilated gas-burners exhaust the atmosphere as much as would forty or fifty guests. The result is general discomfort and often evident permanent injury to the health. Were the host aware of the extent to which the enjoyment of his entertainment — not to say the health of his guests — is impaired by these causes which a fractional part of the cost of the feast could have removed, he would have provided pure air for the lungs of his friends, even if to do so it had been necessary for him to buy simpler food for their stomachs and reduce his band of fiddlers. The body is covered with little vent-tubes, many hundreds in every square inch, called perspiration-tubes, for the escape of vapor and fatty matter from the skin. This vapor arises constantly from all parts of the body, carrying with it the deeayed organic matter thrown off in large quantities every day from the pores, and mingles with the breath, itself loaded with the impurities which it is its very office to remove from the blood. What if, instead of compelling our guests to feed their lungs upon these exhalations from the skin and nostrils of their friends, both healthy and diseased, while they were allowed fresh viands for eating, we should reverse the treatment and compel them to eat in rotation one and the same dish, each devouring the morsels that another had masticated and returned again for the enjoyment of the rest! The idea is to us disgusting. But we need to be disgusted to induce us to improve our condition, and the idea would hardly appear more revolting to us than that of consuming the fœtid breath of our neighbors, had not habit rendered us peculiarly callous to the latter. Yet how delicate the structure of our lungs, and how careful should be our treatment of them! The extent of the respiratory surface in the lungs of an average adult is calculated by Lieberkühn[3] at fourteen hundred square feet, and

[2] This paper, by the writer of the Open Fire-Place articles, will be incorporated with them in their separate form.

[3] Simon's Chemistry of Man. Philadelphia, 1846.

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the number of air-cells of which it is composed is estimated by some at six hundred millions. Through this wonderfully complex structure the air of our crowded ball-rooms is pumped twenty times a minute, loaded with its dust and impurities, although it is here that the blood should be aërated for purification! "There are," says Leeds, "on an average, about seventy-two pulsations of the heart every minute, and two ounces of blood are passed through the lungs at each pulsation, or from sixty-five to seventy gallons every hour, and from forty to sixty barrels per day. . . . We thus see the very large amounts of blood and air that circulate through the lungs, and can easily imagine of how much greater importance the proper supply of air is to the maintenance of good health than the supply of food, because, while we eat less than two pounds daily, we breathe fifteen times that amount, or about thirty pounds." Fifty barrels of blood are forced through the hundreds of millions of air-cells of the lungs for the purpose of obtaining the purification of fresh air. Yet we give it foul. An atmosphere forty miles in height has been provided by Nature, to ensure us an ample supply for this blood purification, and at the same time we have been provided with a breathing apparatus evidently designed to prevent inhalation of the same breath twice. Yet we shut our friends up for entertainment in boxes so arranged that it is impossible for them to obtain a single breath of air that has not been breathed over and over again, perhaps a hundred times and by a hundred different persons. The impurities of the blood have then to be carried back again from the lungs to all parts of the system, and diseases of all forms follow. When the delicate air-cells become choked, consumption begins. Unfortunately we do not always observe in crowded rooms the gradual deterioration of the atmosphere because the senses become benumbed and accustomed to it; but enter suddenly from the outer air, and the foulness appears at once.

In the room described as allowing two cubic meters of air to pass by way of invisible cracks, there were five windows having north, south, and west exposure, and two doors, to say nothing of a fireplace and three other openings for gas-ventilation, etc. When the experiments were made, all the furnace registers throughout the house were shut excepting the one in this room, so that the maximum of hot-air pressure might be obtained at this point. The amount of air forced through the chamber was, nevertheless, only 1.5 cubic meters per minute. Were the number of openings reduced one-half, leaving a number more usually found in rooms of the size of this, the ventilation under the same pressure would have been 0.75 cubic meter, — hardly sufficient for one person. Had there been but two openings, say one window and one door, a condition not infrequent, we should have had only about 0.4 meter of fresh air per minute, and the air of the room would very soon become foul, even without the consumption of gas and under the pressure of the hot-air column. Were the pressure removed the air of the room would have been nearly stagnant.

In heating and ventilating a room, provision should be made for the maximum number of persons it is likely at any time to contain and for each burner contained in it, supposing all to be in use. A parlor, for instance, in which an entertainment for fifty guests is provided, and ten unventilated gas-burners are used, should have foul-air exhaust openings and fresh-air supply sufficient to change the air at the rate of one hundred cubic meters a minute, or, if the gas-burners are ventilated, at the rate of fifty cubic meters per minute, assuming that the room is connected with others equally filled with guests and burners. Supposing we allow the air to travel through the openings at the rate of one hundred meters a minute, these openings, both exhaust and supply, should each be at least a meter square in the aggregate, and the arrangements for changing the air should be such that the air is *actually* and not merely *apparently* changed at the rate established, and this without extraordinary expense or inconvenience. There are few rooms to be found with even an approximation to such ventilation. It is nevertheless possible, and the manner in which it has been accomplished by the writer will next be described.

THE SERAPEUM OF MEMPHIS.

A LECTURE was lately delivered by Professor A. Mariette, M. A., before the members of the Crystal Palace Company's School of Arts, Science, and Literature, on "the remarkable discovery of the Serapeum of Memphis," by the brother of the lecturer, now His Excellency Mariette Pasha. After some introductory observations, the lecturer proceeded to say that M. Mariette eagerly volunteered to follow the track of Lord Prudhoe, afterwards fourth Duke of Northumberland, and of Tattan, to collect for France what Coptic and Syriac manuscripts had escaped the investigation of the two great English travellers, and after inquiry the French Government did not hesitate to accept his services. In August, 1850, the young *savant* left France for Egypt. In Alexandria he was surprised to find lying in the gardens of European residents, a great number of sphinxes in limestone, covered with ancient Greek inscriptions. He was informed that they had all come from Sakkarah, the site of the ancient Memphis, and had been found in the desert, and he concluded that they could not but be connected with one of the marvellous avenues that led to the Egyptian sanctuaries. On reaching Cairo, Auguste Mariette placed himself in communication with Linant Bey, who volunteered to guide him in his expedition. Having visited the Pyramids and explored the vast necropolis in the midst of which they stand, he proceeded to Sakkarah, and while awaiting the arrival of his friend he made a topographical survey of its necropolis. He purposed remaining a few days: he actually remained four years. He remembered a passage in Strabo, in which the old geographer, who was born sixty years B. C., spoke of the Serapeum of Memphis being placed at the entrance of the Libyan desert, and being constantly threatened with invasion from the sand. Soon afterwards his foot struck against what proved to be a libation-table, sculptured in honor of Osiris-Apis, which is now to be seen in the Louvre, and he concluded that the tomb of Apis, which must contain so many scientific treasures, could not be far off, and he determined to seek for the Serapeum at all risks. The search for manuscripts was given up, and his credit and future career were at stake. The Egyptian Apis, as old as the worship of the divine bull, had two homes, in one of which he lived under the name of Apis; the other, where he reposed after his death, under the name of Osorapis or Serapis. He was prepared to find the latter plundered of its treasure, as it was, by the early Christians, but the plunderers had perhaps spared the archæological and historical treasury, which was far more valuable than any amount of silver and gold. He commenced his labors in the desert with a score of fellahs, — some with pickaxes, some with baskets to carry off the sand. A second sphinx soon rewarded their labor, and others followed to the number of twenty-one. They formed a few of those which constituted an avenue of sphinxes in the middle of a vast necropolis. The avenue wound its crooked way between vast funeral monuments. The labor entailed might be gathered from the fact that while the sphinxes first discovered lay at a depth of twelve feet below the surface, the others were found at a depth of between sixty and seventy feet. At last the one hundred and thirty-fifth sphinx was brought to light at a spot where the avenue turned to the right at an angle of 85°. The work was pushed on vigorously in spite of enormous difficulties, which the lecturer detailed at some length. One day eleven of the laborers were buried under an avalanche of sand, and were with difficulty extricated. The head men of the neighboring villages ordered that all supplies of food should be withheld, and the fellahs were forbidden to work for him; but in spite of these and various other difficulties, including orders from the highest authorities in Cairo to desist, which he disregarded, he still persevered. After the one hundred and forty-first sphinx had been secured, a spacious dromos paved with fine flag-stones was discovered. It was in shape a semicircle, decorated with eleven Greek statues of poets, philosophers, and lawgivers, and it stopped the explorer's way. He determined on a new departure, and soon came on a chapel bearing the royal cartouche of Neelanbo I., of the thirtieth dynasty, the last but two of the indigenous Pharaohs. The image of Apis stood there, a welcome indication to the young explorer that he was on the right track. But the chapel stopped his way, and he had to take a new direction. He did so to the west, and two other chapels were discovered, one in the Egyptian and the other in the Greek style. The latter was empty: in the former stood a statue of Apis in stone with the solar disk before his horns. The statue, before which Alexander the Great, Cleopatra, and Cæsar must have passed, and which must have witnessed the last solemn rites of the funerals of Apis, is now an object of admiration at the Louvre. Along both sides of a paved causeway ran a wall six feet high, built of huge blocks, upon which, as upon a pedestal, stood colossal statues of fantastic animals. A peacock, six feet high, carrying a little Genius, a gigantic cock, a lioness, a panther with a serpent's tail, a Cerberus, — all led by children, — a phœnix with a woman's head, lions with strange faces; all samples of the mystic symbolism of Egypt, as conceived by the Greek mind. The work was carried on in most trying circumstances. All sorts of impediments were thrown in the way of the indefatigable archæologist, but they were got over. High officials arrived from Cairo with prohibitions which he contrived to disregard. When his labors were found to be crowned with success, the Egyptian authorities claimed their fruit; but the monuments he had discovered he contrived to have conveyed to Alexandria and shipped to France. European international jealousies and Turkish cupidity conspired together against the young antiquarian, but with unflagging enthusiasm he continued his course, and after a lengthened period the French Government interfered on his behalf, and sent him a large and welcome remittance. The details of the further excavations were narrated by the lecturer, who added that during the night of November 12, 1851, the last loads of sand were removed, and a long gallery was opened to view. The explorer attempted to enter, but his light was extinguished by foul air. At last he was enabled to enter, and stood in the tomb of Apis. He beheld walls covered with tablets with thousands of texts and with divine images, a treasure of historical documents which have no parallel in the world. It was not until February, 1852, that a less intolerant *régime* enabled the excavators to work at all efficiently. To the 513 monuments which had been already forwarded, over 2,000 others were safely sent to Alexandria. The sarcophagi discovered were of polished granite, each cut out of a single stone, and were ten feet in height and thirteen feet in length, and weighed upwards of sixty tons. It was difficult to realize by what mechanical contrivance such enormous masses of stone were transported to their resting places from the far-distant quarries. When the entrance to the great tomb was effected, the finger-marks of the Egyptian who had closed up the last stone of the wall were still visible in the cement, and on the sand of the floor was still to be seen the impression of the naked feet of the workmen who 3,230 years before had deposited the deified Apis in his tomb. This

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and other tombs yielded many valuable and beautiful specimens of jewelry which now enrich the collection of the Louvre. — *The London Times.*

THE ILLUSTRATIONS.

THE ASTOR LIBRARY, NEW YORK, N. Y. MR. THOMAS STENT, ARCHITECT, NEW YORK, N. Y.

This view shows the recent alterations in the building.

HOUSE FOR W. H. STRONG, ESQ., DETROIT, MICH. MR. J. M. DONALDSON, ARCHITECT, DETROIT, MICH.

A VILLAGE CHURCH. MR. GEORGE T. TILDEN, ARCHITECT, BOSTON, MASS.

This little church was designed for a small corner-lot in a country village of New Hampshire.

REREDOS FOR GRACE CHURCH, NEW YORK, N. Y. MR. JAMES RENWICK, ARCHITECT, NEW YORK, N. Y.

ALTERATIONS TO A HOUSE AT ARLINGTON, MASS. MESSRS. HOWE & DODD, ARCHITECTS, BOSTON, MASS.

THE DRAINAGE OF TOWNS.[1] — I.

There are three kinds of material to be removed by drainage: —

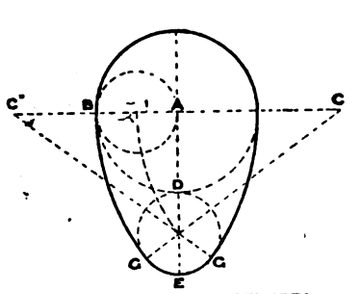
First, Subsoil-water, or that part of the rain-fall which soaks into the ground, and which may, if not drained off, remain too near the surface for health.

Second, Surplus rain-water which runs on the surface.

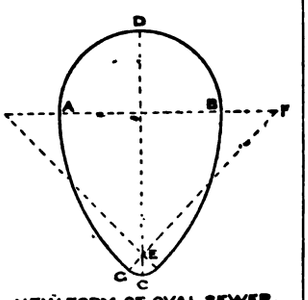
Third, Sewage, or the fluid and water-borne refuse of houses, stables, and manufacturing establishments.

Previous to the beginning of this century, and even later, the large cities of Europe provided drains chiefly for the surplus rain, or surface water, which was discharged into the nearest water-course. It was illegal, says Baldwin Latham, to drain fecal matter into the London sewers prior to 1815, and only in 1847 was such drainage made compulsory. [Boston has not made it compulsory to this day.]

The sewers of the last century were nothing but rain-water culverts. Their faulty construction to act as conduits for sewage, or even for street wash, is plain enough when viewed in the light of modern experience. They were generally formed with flat bottoms, often having side-walls of rough stone, and with very little attention to uniform grades. The result was a large accumulation of solid matter, sometimes to such an extent as not only to block the opening, but to create very offensive exhalations by the decomposition of this detritus. Soon after the admission of water-closet and other house drains into the sewers, this evil became so aggravated that the matter was taken in hand by engineers, and proper attention has since been given to these details. The annexed figures show the modern forms of brick sewers.



OLD FORM OF OVAL SEWER.



NEW FORM OF OVAL SEWER.

The drainage of subsoil-water, to avoid saturation near the surface, is effected to a considerable extent in modern brick sewers, owing to their being constructed with somewhat porous walls. The importance of keeping the ground-water several feet below the bottoms of cellars is not fully appreciated, so that very little attention has been given to this subject in practice. Except by the adventitious drainage through the pores of brickwork, just alluded to, scarce anything has been done for this end in cities. All cities and towns that are built upon clay-beds or other impervious soils should consider this subject more fully. If the subsoil is gravel or sand, and sufficiently raised above the valley-bottoms, it may take care of itself, but many cities are not so underdrained by Nature. If the sewers act as subsoil-drains, through their porous walls, they will also be liable to allow the fluid portion of the sewage to *leak out* into the soil whenever the ground-water is reduced below their level by a drought. Two evils result from this, viz.: the pollution of the soil by such leakage, and the choking of the sewers themselves from the lack of fluids to wash along the more solid parts of their contents. The following method for taking off a part of the subsoil-water has been adopted in Oxford and some other English towns, viz., to provide a pipe of twelve inches diameter, or less, to be laid directly below the sewer. This is a necessary adjunct in construction of sewers through very wet ground, serving to gather the ground-water to the sumps from which it can be pumped out. Such pipes are often much encumbered with sand during the construction of the works, but if this can be avoided the same pipes can permanently serve a useful purpose as subsoil-drains, if the sewer is made tight enough not to leak into them. The true method in such cases would doubtless be to provide a separate system of subsoil-drains. But very few if any cities have yet done so. The ordinary way is to build the brick sewers so as to let the water in, not so much from intention as because it is very difficult to make them tight in wet ground, though they *can* and *should* be made so. If the ground were *always wet*, there would be no danger of outward leakage, but we can rarely be sure of this. Moreover, if the sewage is to be pumped or otherwise treated at the outfall, we do not wish to be encumbered there with a needless bulk of water.

SEPARATION OF SEWAGE AND RAIN-FALL.

The construction of separate ducts for the sewage and for the surface or rain water is a question about which a great variety of opinion prevails. I know of no town or city where such a separate system has yet been provided in this country, though we are told that the city of Memphis is now about to do so. The usual method is to allow the surplus rain-water to enter the sewers at convenient points, with the view of assisting the flow of the sewage by its scouring effects. Of course, if this plan be followed, the capacity of the sewers must be proportioned to the duty imposed upon them. In most temperate climates the volume of such surface-water to be dealt with is many times that of the house-drainage, generally from ten to twenty times as great, so that the volume of *sewage* has had but little to do in governing the capacity of the sewers. It was necessarily controlled by the rain-fall.

But even when dealing separately with the rain-fall, it is conceded by all to be best to allow a small portion of it to enter the sewage-pipes; viz., at least such portion as may fall upon the front roofs of buildings. If *any* portion is so taken, due regard must always be had to it in adjusting the size of the conduits to the duty. The house-drainage alone can never exceed in volume that of the water-supply, for the solid matters added to the water are less bulky than the portion of water lost by evaporation. The flow of house-drainage is, however, not uniform, but concentrated mostly during the working hours of the day, and reaches its maximum during the forenoon. Hence allowance must be made for this maximum, which is sometimes fully double or nearly three-fold the average rate of flow.

The arguments in favor of separating the bulk of the rain-water from the sewers are of the greatest weight in a scattered population, such as often occurs in suburban towns, and the objections increase in force as the population becomes more dense. A few English towns have recently been provided with sewers on this principle, among which is Oxford, where it has been in use some two years, and is said to be quite satisfactory so far. The chief reasons in favor of the separate system are as follows: —

1. Economy. The separation avoids the construction of long lines of large mains, because the rain-fall is conducted by short conduits to the nearest water-course, it being rarely found necessary to collect the whole discharge at any one point for a whole district. But it is not proper to discharge *sewage* in this way; so that, if both are mixed, we have either to transgress this rule, by discharging the mixture where it ought not to go, or build long mains of large size for its collection at some one place where the sewage can with propriety be dropped.

This combination of rain-water with sewage becomes a very serious encumbrance whenever the sewage requires either an artificial treatment of any kind at the outfall, or even pumping alone; for the works adapted to handling the sewage alone would be increased in capacity very largely if required also to handle surface-water. Moreover, the volume of the latter is so exceedingly variable that a large part of the plant provided for the maximum must necessarily lie idle for a greater portion of the time. If the sewage is used for irrigation of land, as is now becoming a common method in Europe, the trouble is not then avoided, for the same rain-storm which gorges the sewers to their full capacity has also the effect of saturating the soil to be irrigated, thereby rendering it less capable of absorption, and likely to become sodden and noxious.

2. The sanitary considerations arising from the better "self-cleansing" qualities of small pipes, carrying a more uniform flow. The variable volume of the rain-water requires large conduits to be provided for occasional storms, while for most of the time they are charged with an insignificant flow, not enough to render them "self-cleansing" by scour. The dry-weather flow, in fact, occupies but such a small part of the large sewer, that it does not move with sufficient velocity to avoid deposits. If such deposits occur, the end is defeated for which the sewer was intended; viz., the complete and rapid removal of all the sewage to its ultimate destination. This is one of the axioms of the profession, — a point upon which all modern sanitarians are agreed; for it is admitted by all that great harm must result from the delay and consequent putrefaction of the matter deposited by sewage, while, on the other hand, if the sewage is kept moving, very little change need take place in its condition while it remains within the conduits, and the noxious character as well as the quantity of the gases of decomposition would be kept at a minimum.

I copy the following from the London *Engineering*, of January 16, 1880: "The subject of separating the rain-fall from the sewage of houses, in passing through the sewers, has received much attention. Generally speaking, engineering authorities are agreed as

[1] A lecture by Mr. Edward S. Philbrick, C. E., delivered before the students of the Massachusetts Institute of Technology.

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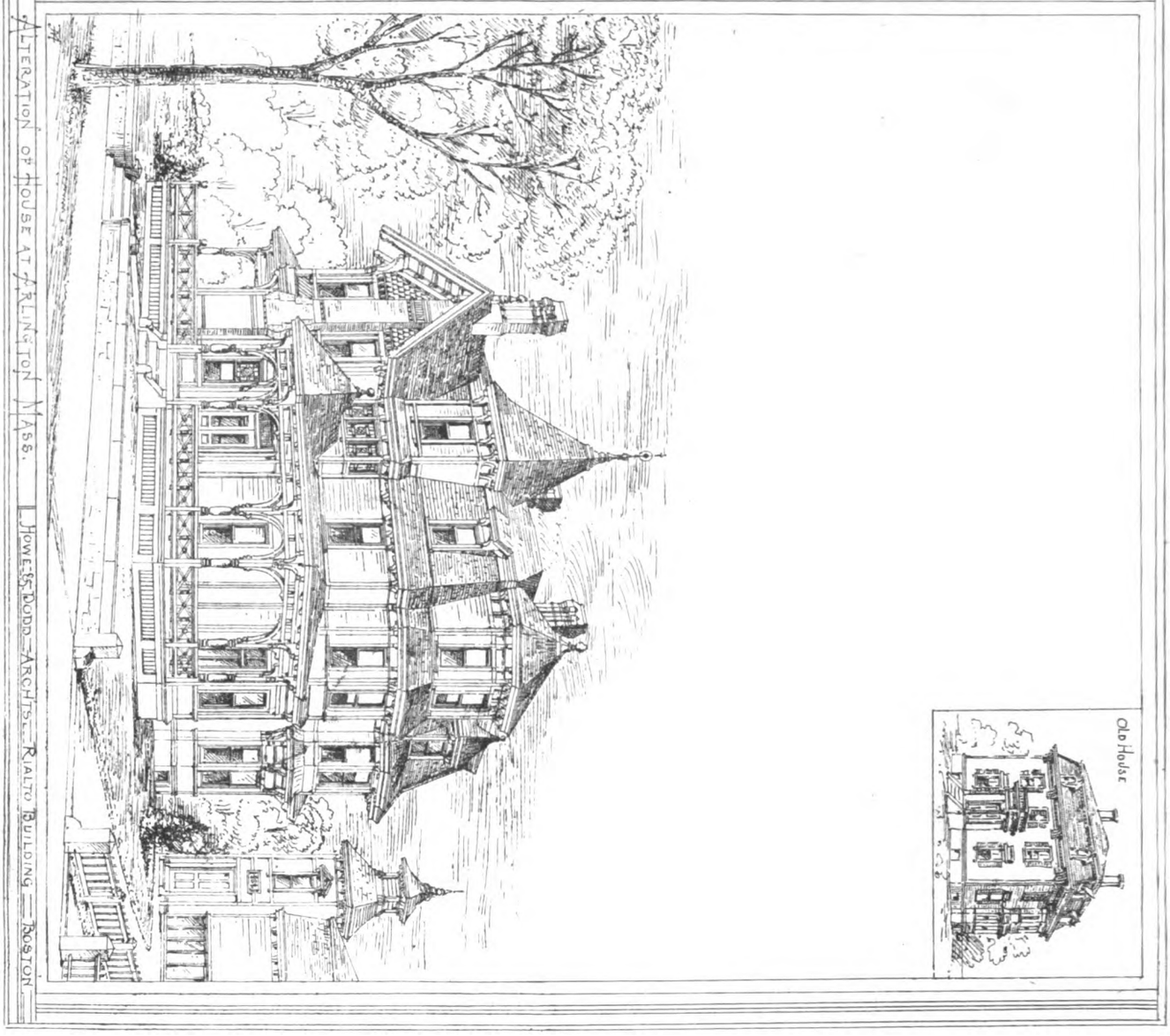
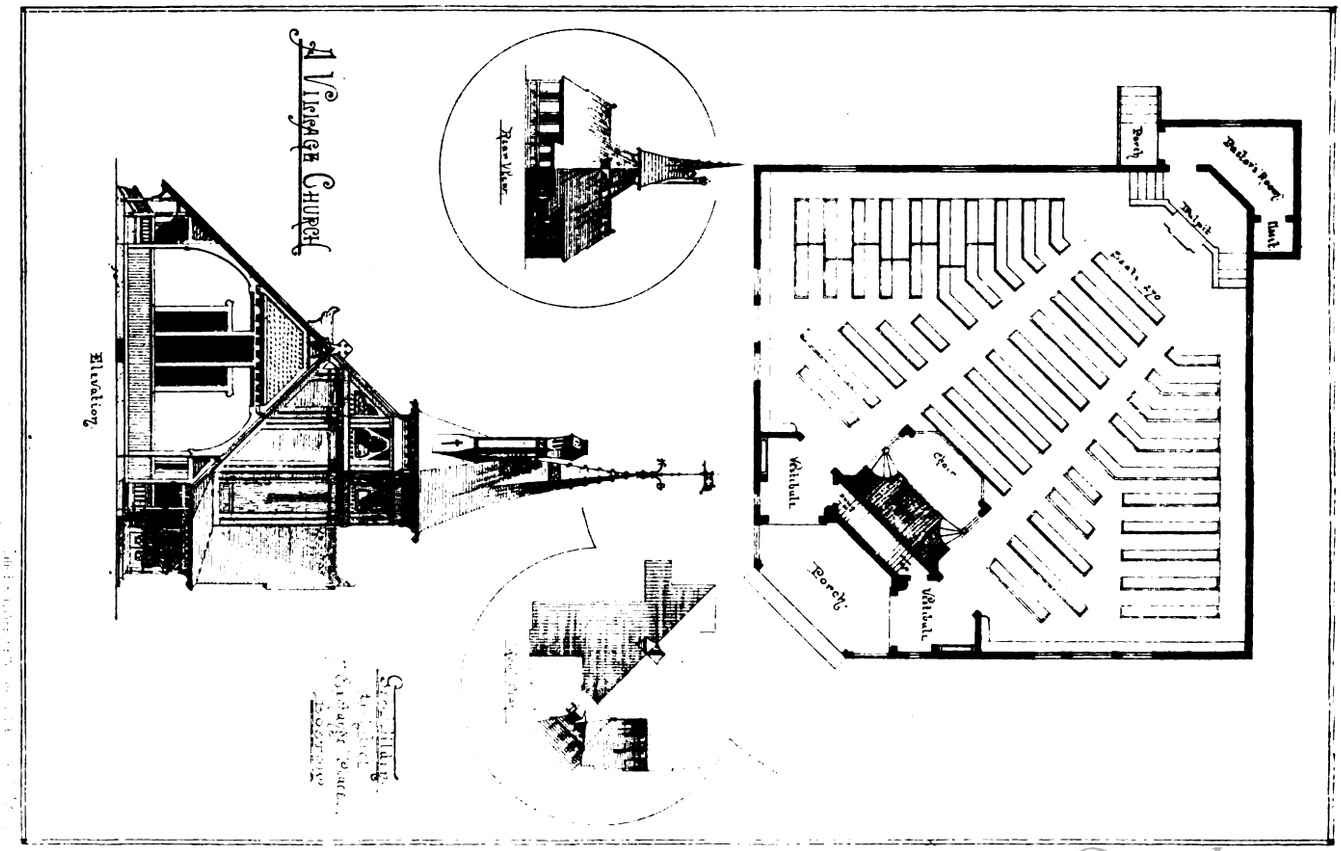
ALTERATION OF HOUSE AT ARLINGTON MASS.

HOWES & DODD ARCHITECTS RIALTO BUILDING BOSTON



A VILLAGE CHURCH



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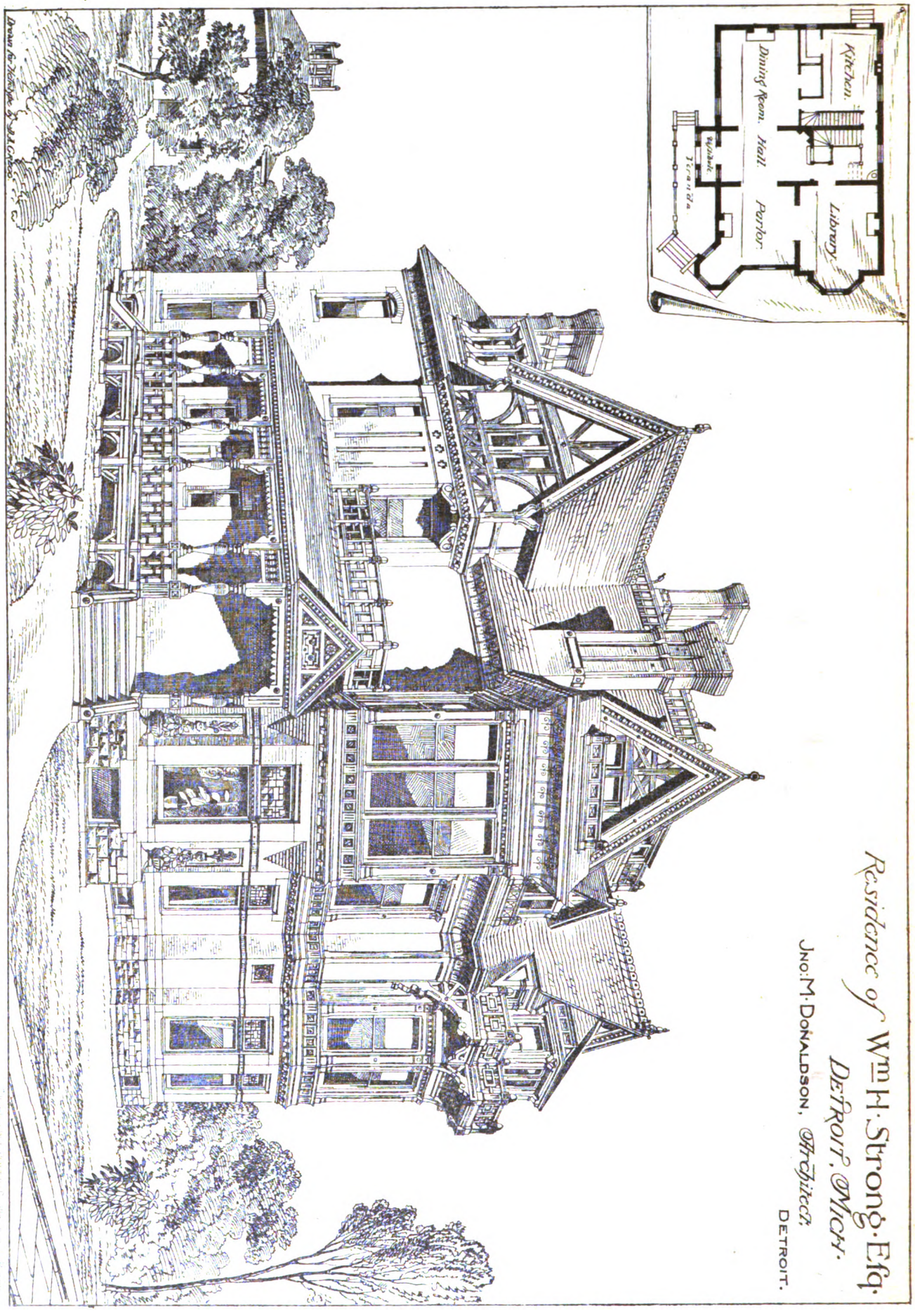

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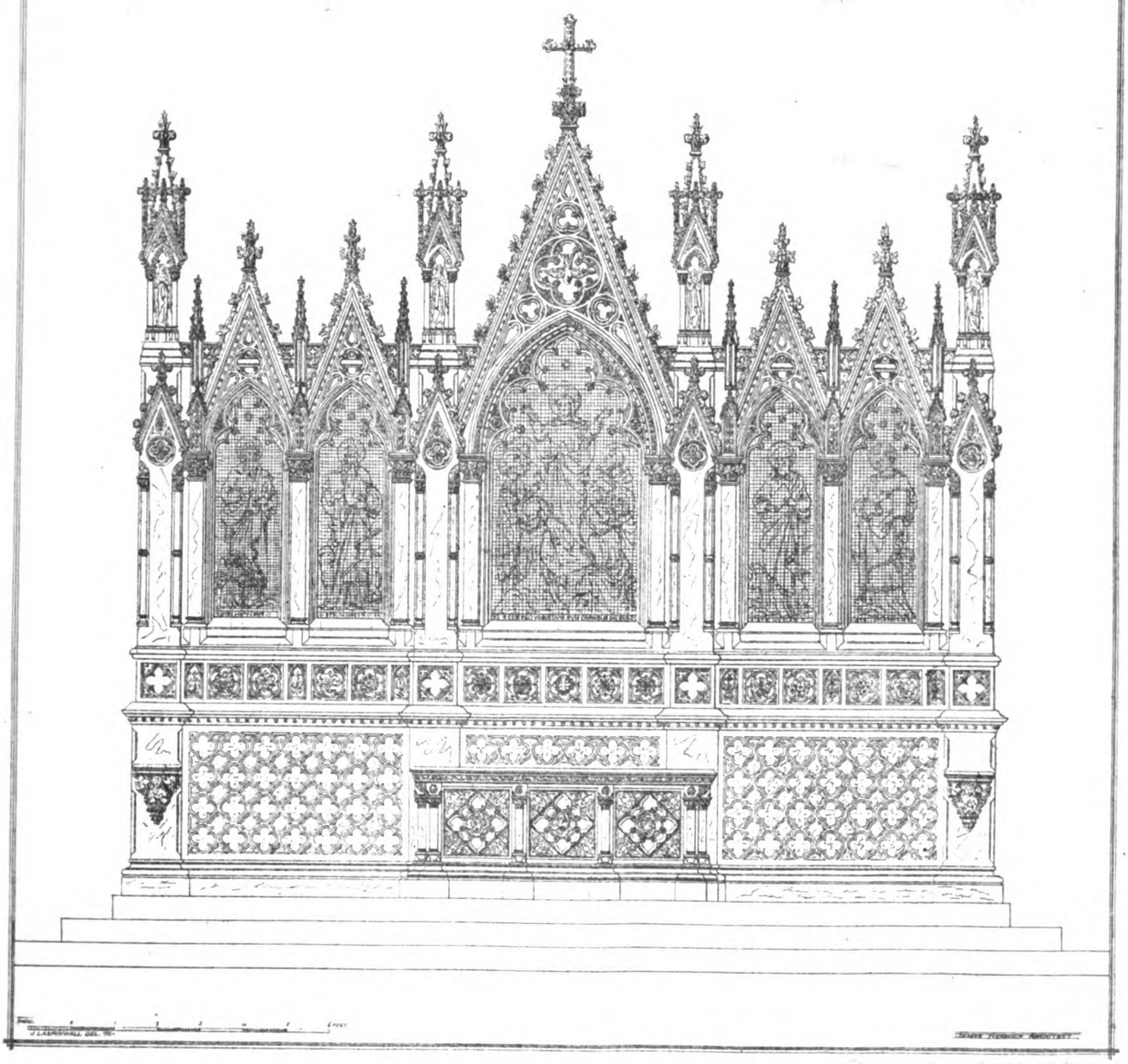
New Reredos of Grace Church
New-York



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to the desirability of such a separation. In London the amount of road refuse which enters the sewers is enormous, continually blocking them, and consequently sending the sewage and sewer-gases into the houses."

It may be argued by the advocates of a combined system that the rain-fall scours out such deposits; but it must be remembered that we have in this climate such long droughts that several consecutive weeks often pass during which no considerable rain-fall occurs; and this is likely to be during the hottest part of the year. The result would be the collection of deposits at such times, just when the heat renders the changes by decomposition most rapid, and its effect upon the health of a community the most powerful.

The flow of sewage is, as above explained, comparatively uniform, being subject to only daily variations, and always within certain definite limits. It can therefore be definitely and cheaply provided for by such sizes of pipes as are needed, and which will for these reasons be so far filled every day as to insure there being scour enough to keep them free.

For such small towns as can readily take care of their rain-water on the surface, the above reasons are certainly strong ones in favor of separating the sewage flow. In such towns the street traffic is so moderate that the street water is not very foul, and can therefore be discharged with impunity into the natural water-courses. Such towns, too, are precisely the ones that will find the saving of capital by the separate system an important item in their finances, and on whom the burden of constructing large and long main sewers would be found oppressive if not prohibitory. But grave objections are found in various places, viz., in most large towns, to the plan of separate ducts for sewage and surface-water. First, the liability of polluting the brook-channels and even larger water-courses by the discharge of street wash into them. Very few towns remove the horse-manure from their streets so thoroughly as to prevent the more soluble parts from being washed away by every rain, with whatever other organic matter or loose material happens to be lying about in the shape of dust. If the surplus rain-water from the streets be delivered to the nearest natural stream, unless this be a large one, there will be a constant accumulation of silt in its channel, containing such a quantity of organic matter that it could hardly fail to become offensive in warm weather. The variable character of the flow, dependent on the rains, would favor the continual deposit of banks of foul silt in such channels, which cannot be self-cleansing. The result would be very unsatisfactory in all small brooks and streams of insufficient volume to largely dilute and carry off such impurities.

There is a second reason which operates with a good deal of force against any attempt to separate sewage and surface-water in our older cities; viz., the complications arising from an increase in the number of underground pipes in our streets. Most cities now have already gas-mains and water-mains under the pavements. If we add to these not only one set of sewers, but two, one for house-drains and one for street gullies, we have to consider how all these systems are to cross one another at every street corner, and how the small house pipes from either side the way are to cross the mains with which they do not connect, and still preserve the continuous slope for both mains and branches, which is indispensable for drains, and quite important for gas and water-supply pipes. Of course each system of mains could be laid at a different depth below the pavement, to provide for this crossing; but the grades of sewers often depend upon other things besides the level of the pavement. A long sewer must have often but a very slight descent, and cannot vary in inclination as the surface of the street may. So its depth cannot be a constant one. So long as we have only one set of sewers, acting also as drains, we can put them deeper than the gas and water-mains, which are usually laid at successive levels above the sewers, and nearly of uniform depth below the pavement; but, if we must have two systems of drains, their slopes or grades may often clash with one another and create much inconvenience. Of course such intersections and superpositions can be made feasible and practicable, but not without cost and continual trouble,— a matter that should be duly taken into account in considering such a change. If the day should come, as it may, when we have sub-ways under our pavements, in which all these main pipes can be laid and repaired without taking up the pavement so often as is now done, then the putting in of an additional pipe would not be of so much importance as it is under the present condition of things.

Moreover, we must remember in connection with this discussion that the old-fashioned wide or flat-bottomed sewers, which favored the accumulation of sediment when but a small flow occurred in a large sewer, are no longer built in these days. The modern forms are like the long section of an egg with the small end down, so that the invert, even though covered with only six inches of flowing sewage, is narrow and smooth, and unlikely to collect any considerable quantity of deposit, even when the sewers are ten or twenty times as large as required for the dry-weather sewage alone.

It is evident that the circumstances of the locality which happens to be under consideration must be carefully considered in relation to this question. Thus the separate system of pipes for sewage and rain-water may not only be well adapted to many towns or districts with a somewhat scattered population, but also even in large towns, perhaps, where the rain-water can be discharged into rivers of considerable size, that would not become polluted thereby. Still, if the town had within itself the elements of an indefinite increase, as many American towns have, the village of to-day may be a crowded city in the next generation, losing all the rural characteristics of both streets and brooks. In this case any provision which might have been suitable for a suburban population would cease to be so when the conditions had changed.

THE PROPOSED ENTRANCE EXAMINATIONS TO THE R. I. B. A.

THE annual report of the Council of the Royal Institute of British Architects contains the scheme of the examination which it is proposed to make compulsory on all candidates for membership after May, 1882. It was prepared by a special committee, consisting of Messrs. Whichcord, Lewis, Jones, C. Barry, T. H. Wyatt, H. L. Florence, J. D. Mathews, Cates, E. I'Anson, T. R. Smith, Waterhouse, and W. H. White. The scheme is as follows: —

1. That the examination under by-law XIV. shall be in professional subjects only.

2. That, as it is important not to deter candidates from presenting themselves for examination, the test shall not at first be severe; and further that the names of those who pass shall be returned alphabetically.

3. That the following shall be the general outline of the examination, viz.: —

(i.) *Probationary work*, consisting of authenticated proofs of the candidate's ability in drawing and perspective, to be submitted by him prior to the examination. (See for exemptions Nos. 10 and 11.)

(ii.) *A written and an oral examination* which shall test the candidate's knowledge of the following subjects, viz.. —

a. History of Architecture.
b. Mouldings, features, and ornaments of one recognized architectural style, selected by the candidate.
c. Filling in of an outline block-plan of a building with the details of arrangement for a selected purpose.
d. Specifications and methods of estimating the cost of erecting any building.
e. Shoring, underpinning, and dealing with ruinous and dangerous structures.
f. Materials and construction, and calculations for ascertaining the strength of materials.
g. Contracts, dilapidations, and general practice.

4. That, as it is important to offer facilities for joining the Royal Institute of British Architects, there shall be not less than two examinations in the year, one to take place about four weeks before the commencement of the session.

5. That examinations under by-law XIV. may be held in the principal towns of the United Kingdom, and, if practicable, under the supervision of those architectural societies whose regulations shall have been recognized by the Royal Institute of British Architects. The arrangements for these examinations shall be subject to such conditions as the Council of the Institute may from time to time prescribe.

6. That a fee of three guineas shall be paid by each candidate prior to examination; the said fee to be placed to his account as his entrance fee should he be elected an Associate within twelve calendar months from the date of his passing.

7. That a Board of Examiners, of not less than five Fellows of the Royal Institute of British Architects, shall from time to time be appointed by the Council; that the said Board shall draw up the questions for each Examination, consider the answers, and examine the candidates orally; that three Members of the Board shall form a quorum.

8. That for each Examination two Moderators, either Fellows or Associates of the Royal Institute of British Architects, shall be appointed by the Council of the Institute, to be in attendance during the time in which the written portion of the Examination is proceeding.

9. That for the present the services of the Examiners and Moderators shall be honorary.

10. That the Board of Examiners shall have discretionary power to take into account any previous successful examinations, or prize competitions, in the Institute or elsewhere, of candidates for Associateship.

11. That all practitioners of architecture who have been in the active exercise of their profession prior to January 1, 1875, shall be exempted from submitting any probationary work. (See No. 3, section i.)

The Council regret the absence from the ranks of the Institute of several well known and esteemed architects, who, on account of being directors and shareholders of trading companies, are unable to subscribe to the declaration — "I will not have any interest or participation in any trade contract, or materials supplied at any works, the execution of which I may be engaged to superintend." In one instance a candidate for membership was pecuniarily interested in the manufacture of decorative work of a particular kind, and of a higher character than could be otherwise procured. The Council were therefore asked to consider whether the terms of the declaration might not be relaxed where they press somewhat heavily, but after careful discussion, they felt that such a relaxation would involve so much risk they were unprepared to recommend it.

The report concludes by stating that the subject of professional competitions, about which so much has been written and said during

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a generation, and which is still one of the questions of the day, is receiving careful attention from a special committee, appointed by the Institute. Many other equally important matters have been discussed by the Council in the twenty-five meetings held by them during the official year. They share in the hope recently expressed by Mr. Thomas H. Wyatt, the President of the Architects' Benevolent Society, that its happy connection with the Institute may result in lasting advantage to the charity; and the Council, who are also indebted to him for valuable assistance as the Honorary Secretary of the Institute, rejoice in the success which has attended his efforts to increase the benevolent fund, the objects of which deserve liberal support from all the professional members. The present, by Professor Donaldson, of a gold badge and chain of office, to be worn on certain occasions by the President for the time being, and when acting as the representative of the Institute, has added to the long list of obligations due to him. That his experience and judgment may be preserved to the members, during the important period which is to witness the introduction of compulsory examination for membership, and for many subsequent years, cannot be too earnestly desired. In fine, during the summer of 1881, a general conference of architects of the United Kingdom will take place, which the Council hope will afford the means of securing further professional support; and this will be followed in 1884 by another conference, which may celebrate the fiftieth anniversary of the foundation of the Institute.

THE COMPETITION FOR THE NEW PARLIAMENT BUILDINGS AT TORONTO.

Toronto, May 11, 1880.

The architects of Toronto and neighborhood, on receiving copies of the instructions relating to the competition for new Parliament Buildings, immediately held a meeting at the office of Messrs. Langley, Langley & Burke to consider the conditions. After about two hours of careful discussion, a committee was appointed to draft a memorial to the Hon. Commissioner of Public Works, containing the views expressed by the architects present. This committee met and drafted a memorial, a copy of which is enclosed.

It was resolved at this meeting that, in order to give the petition as great weight as possible with the Commissioner of Public Works, the signatures of as many architects in the city and throughout the country be secured to this memorial as can be obtained.

Owing to the difficulty of obtaining the names of all the architects practising in the Dominion, we are compelled to rely to some extent on the kindness of those whose names we have been able to procure to give us all the assistance in their power in obtaining signatures to the enclosed document, as the larger the list and the more extended the residence of the signers, the greater weight we hope it will have with the Commissioner of Public Works.

We trust that all architects will look upon this as a professional and not a personal matter. The fact that, owing to some cause or other, he may not intend to compete, should not prevent any man signing the petition. Let each consider that as an architect he is in duty bound to assist to raise the profession in every way that is in his power.

We do not ask any architect to sign this memorial who does not agree with the clauses contained in it, but we do ask all to sign it who agree with the general principles therein laid down, although not agreeing with minor points.

It is of the greatest importance that this matter should be attended to at once. We desire to have all copies returned to us as soon as possible.

In returning the signed copies address them to Frank Darling, 56 King Street East.

Hoping that this matter will receive your approval and prompt attention, we are

Sincerely yours,

Signed, Henry Langley,
Of Langley, Langley & Burke,
Chairman of Committee.

Joseph Connolly,
Frank Darling,
Of Darling & Curry,
John Gemmell,
Of Smith & Gemmell,
George H. Lalor,
David Roberts,
Walter R. Strickland,
Stewart & Strickland,
} Members of Committee.

TO THE HON. C. F. FRASER, COMMISSIONER OF PUBLIC WORKS.

We, the undersigned architects, having received copies of instructions as to the proposed competitive designs for the new Parliament Buildings to be erected in the City of Toronto, while acknowledging their general excellence, respectfully beg leave to draw your attention to a few points, which our profession feel very strongly require amendment, both in the interests of a building of so great importance, as well as in justice to ourselves, and which we think cannot but commend themselves to your judgment.

1st. — We feel that the length of time allowed is altogether inadequate for the preparation of the designs and the proper elaboration of the very large number of drawings required for such a work. The time now remaining is only ten weeks, at a period of the year when architects are most busily engaged with their general practice. It cannot but be evident to you that a building of such magnitude will demand a very large amount of care, study and thought, quite sufficient to occupy the designer exclusively for at least three months, not taking into account the vast amount of mechanical work subsequently required to perfect the drawings.

As a matter of fact the lack of a sufficient number of competent draughtsmen in the country, renders it utterly impossible for architects to furnish proper designs within the time named even in the crudest form.

In view of the foregoing, we feel that the time ought to be extended to the 1st day of January, 1881, or at the very least to the 1st of December next.

We would respectfully urge upon you the strong probability that if such extension is not granted, the best talent of not only this country but also of the United States and probably of England will be debarred from competing, a circumstance which would be much to be deplored considering the very great importance of the work.

2d. — We would deprecate anything tending to institute a competition of rates between the architects preparing designs for the proposed buildings by asking them to state the amount of remuneration which they are prepared to accept for their services. The matter, as we understand it, is to be a trial of skill in designing, and not a competition in regard to professional charges. We assert that any man who is capable of preparing a design suitable for erection, which may be approved of by the Government through the experts, whom it proposes to employ, is well worthy the being paid the commission generally allowed by law and custom, and which is in accordance with the rates adopted by all architectural institutes and societies throughout the world.

We believe that you will find that the result of fixing upon the usual rate of five per cent commission will be to induce men of the highest attainment in the profession to compete. We would also urge with all earnestness that it be distinctly stated that the architect whose design is allotted the first place will be employed to carry out and supervise the erection of the building at the rates above mentioned. As a rule it will be found that any man capable of designing a building such as the one in question, will also have the necessary ability and experience to carry it out.

In case, however, it should happen that the architect whose design is selected for erection should be deemed lacking in practical knowledge sufficient to make it safe to entrust the carrying out of the work wholly to himself, it might then be mutually agreed upon that some other man, who in the opinion of the Government would supply the necessary qualities, should be associated with him.

It must be evident to you that the mind which first conceived the design in its general arrangement and outline is pre-eminently the best qualified to design and carry out the finer and more elaborate details which are essentially necessary to that life and expression so characteristic of good architecture.

3d. — In regard to the employment of experts, we would respectfully suggest that they should be non-competing architects of the highest standing, chosen from different points outside of the Dominion, as local men must necessarily be more or less acquainted with the style of their *confreres*, so that if such were appointed judges, the object of the Government in asking for designs under motto in order to keep the source of authorship a secret, would stand a chance of being defeated.

4th. — While agreeing fully to the limitations with respect to the geometrical drawings, we fail to see that there can be any objection to allowing the different competitors to finish their perspective drawings in any manner that they may deem best, provided only, that no color be used, merely etching or washing in with sepia or Indian ink.

5th. — With regard to the Government retaining the drawings to which the second and third premiums are awarded, and the clause making it compulsory upon any competitor to part with his design for the sum of $400, we would respectfully ask that these conditions be altered. The second and third premiums should be offered as a reward and recognition of merit and not as purchase money, and the drawings should still remain the property of the authors, particularly as they can be of no use to the Government. If, however, the Government should deem it advisable to retain any of the designs sent in on account of any special merits which they may possess, they should in all fairness pay to the author such amount as he may be willing to accept. But that under no consideration should it be made *compulsory* for any competitor to sell his design.

RESTORATION IN ITALY.

Mr. Henry Wallis says that the attention of the Italian Minister of Public Instruction may fairly be called to the present state of the Baptistery at Ravenna. It is known to those interested in art and archæology that it has been proposed to raise the building as it stands by some yards, the present pavement being about two and a half metres above the ancient. The realization of this project would be a gain from no point of view. The exterior of the Baptistery is simply rough brickwork, without architectural pretension, and the interior wall below the pavement is in the same state, the ancient decoration, probably marble panelling, being destroyed. Last week, while in the building, Mr. Wallis saw a person who had strolled in with him simply lay his hand on the mosaics, and a large piece fell down. The custodian said this arose from the humidity that saturated the building last winter, on account of allowing open spaces to remain in the walls. Until lately small houses were built against the outside of the Baptistery; these have been taken down and the walls unnecessarily tampered with; even some of the ancient marble panelling has been removed. It would have been unquestionably right to have insisted that the houses should no longer have been inhabited, but they were undoubtedly a stay and protection to the main building. It is intended to "restore" the Baptistery, but the only valuable part of the building is the interior mosaic decoration, and this, to students of art and history, is of paramount interest. Not only are the prophets and apostles among the noblest creations of Christian art, but they as distinctly indicate the phase of Christian belief in the fifth century, as the thirteenth century or sixteenth century frescoes the form it assumed in those epochs. In any way to endanger such a monument is a matter which concerns the whole of intelligent Christendom. This engineer's whim is against the wishes of educated Italians. Mr. Wallis also refers to the proposed restoration of the chapel painted by Melozzo da Forli in the Church of S. Giralamo at Forli. The roof of the chapel is covered with fissures and cracks that have now been for

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three years pasted over with strips of paper, consequently almost completely hiding Melozzo's frescoes. This is especially to be deplored, as his works, which are very distinctive and impressive, are scarcely to be found now save in his native place. The single panel of Melozzo in the Pinacoteca at Forli has, along with some others by Palmezzano, been restored and repainted, and consequently spoilt. — *The Architect.*

ACTION OF THE SUN'S HEAT-RAYS ON HOUSE-WALLS.

THE solar radiation is not without influence on the comfort of the occupants of a house, and it may be very different, according to the orientation and exposure of houses. In a recent number of the *Zeitschrift für Biologie*, Herr Adolf Vogt, having discussed this question theoretically, describes some experiments which he made with reference to it. He cut out of a block of sandstone three plates, 51 ctm. (20 in. square), and only 14 mm. ($\frac{1}{2}$ in.) thick, and attached to the back of each plate a water-vessel of thin sheet-zinc of the same extent as the surface of the stone plate, and with a width of about 2 ctm. ($\frac{3}{4}$ in.) In the water a thermometer was inserted, and the whole vessel, exclusive of the front stone plate, was inclosed in a wooden case, and packed with hair, so that the communication of heat to the water would probably be only from the stone plate.

Three plates so arranged were now set up in an open space unaffected by any shade: one plate looking directly eastwards, one southwards, one westwards. In the shade of the hollow space between the three plates the air-temperature was measured, and at a short distance from these the solar radiation was measured with an actinometer. Hourly observations the whole day through were possible last year, at Berne, only on two days, July 25 and 29. These observations, which alone were undisturbed by cloud or mist, led to very remarkable results, which are shown in tables.

"If we sum up the calorics," says Herr Vogt, "which passed through each of the four walls in the course of one day, the same unexpected result appears from both series of observations, — viz., that the south wall took insolated-heat least, although it was twice as long exposed to the sun's rays as the east and west walls, and although at the time of the most favorable angular position of the radiation to its surface — viz., mid-day, — the power of insolation had reached its maximum for the day. The heat which penetrated through the east wall during about fourteen hours was to the same heat of the west wall, and to that of the south wall, on 25th of July, E.: W.: S. = 100: 75: 69; and on 29th July, E.: W.: S.= 100: 88: 86."

The following are amongst the values given in the table: On the 25th July the highest temperature of the air was 26·6°, at 4 P. M.; the maximum temperature of the blackened actinometer, 46·4°, appeared about one o'clock. Of the three water-vessels, that in the east reached its highest temperature, 33·4°, at 11 o'clock A. M.; the southern, 36·2°, at 3 P. M.; and the western, 40·3°, at 6 P. M. On the 29th July the highest air-temperature, 28°, appeared about 3 P. M. The dark actinometer reached its maximum, 45·7°, at 1 P. M.; the eastern water-vessel reached its maximum temperature of 34·8° at 11 A. M.; the southern was 37·4° at 3 P. M.; and the western reached a temperature of 44°, which was observed both at 6 and at 7 P. M.

OCHRE PAINTS.

THE ochre-beds of the United States are assuming importance in the growth of mechanic arts and industries, as there are constantly increasing demands for good paints of cheap cost. The States where excellent ochre-beds occur are here now mentioned in something like the order of their containing native deposits of ochre, and the relative natural excellences of their qualities and their beauties of colors: Missouri, Arkansas, Georgia, Tennessee, Alabama, Kansas, North Carolina, Virginia, and New York.

The ochres of America are comparable to the best ochres that were ever imported from France and England, but our manufacturers should observe the utmost care in the manufacture of the paints from them. The richest colored and most costly ochres are those which make the orange mineral. Superior beds of this are found in some of the States above named. In our country we have all the varieties of colors and shades of colors, — such as cream-color, yellow, buff, light orange, dark orange, light brown, dark brown, vermilion-red, Indian-red, Venetian-red, and other diversities beside. Ochre paint-manufactories are operated in New York, Missouri, and other States with considerable success. There is far less trouble in the production of these than in most or all other descriptions of paint. The processes of grinding, washing, sifting, and decanting them into settling tubs or vats, where the wet process is used, are the chief labor of preparing ochres.

They admirably fulfil the conditions of being the best "cottage-paints" for either indoors or outdoors. They also are largely used for painting furniture, agricultural implements, bridges, depots, warehouses, barns, and farm structures generally. The great economy in employing ochre paints is in their first cost being one-fourth to one-tenth less than most other paints, and it is asserted by persons of experience that they last longer and continue to look better than many styles of paints which are much in vogue. One of the important qualities which they possess is that of penetrating the surfaces they are applied to, and in the coating of wood substances they not only penetrate the fibres, but they likewise case-harden the substance. This effect is supposed to be due to the fine condition of the silicon which constitutes a part of every species of ochre.

W. G. ATKINSON.

STEAM METERS.

OFFICE OF TROY STEAM HEATING CO.,
TROY, N. Y., May 17, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — My attention has been called to an inquiry in your paper for a steam meter. I would state for your information and your correspondent's that we have a meter, which is a steam trap also. It has been in successful operation here some little time past. I would be pleased to answer any further inquiries.

Very truly yours,

S. E. BABCOCK, *Engineer.*

NOTES AND CLIPPINGS.

CONTINUATION OF THE EXCAVATIONS AT OLYMPIA. — All lovers of art and archæology will rejoice to learn that though there is no hope of any more grants from the German Reichstag for these excavations, the liberality of the Emperor of Germany has from a private source supplied an additional 4,000*l*., which will, it is thought, be sufficient to complete the exploration of the site. As the work draws to a close the question has to be settled where this great collection of Olympian antiquities with which the Germans have so generously endowed Greece is to be finally housed. According to the precedent of the Mycenæan treasure it might be expected that the Olympian antiquities would be transferred to Athens, where they would form a museum by themselves. But it is said that a rich Greek is prepared to furnish the money to build a museum at Olympia itself, and that there is a strong party in Greece in favor of this scheme, in reference to which there is much to be said for and against. If the antiquities are to remain at Olympia, archæologists will have the advantage of seeing them in immediate proximity to the sites where they were found, and the architectural remains can be studied with the illustration of the sculptures. On the other hand, Olympia is a spot very difficult of access at present to the ordinary tourist, and the climate is deadly in summer, and neither agreeable nor salubrious in any part of the year.

A LARGE PUMPING ENGINE. — The big pumping engine at the Union Shaft, built at the Union Iron Works, San Francisco, by Prescott, Scott & Co., is the largest engine of the kind on the Comstock. Some idea of its size and power may be gained from the weight and dimensions of the cylinders and fly-wheel. It is a direct-acting compound engine, and the two cylinders are upright, and placed so as to incline toward each other at the top. The initial cylinder is 65 inches in diameter, with 6-foot 9-inch stroke, and the other cylinder is 100 inches in diameter with 8-foot 3-inch stroke. The big cylinder weighs 43 tons, and the small one 30 tons. The fly-wheel is 37½ feet in diameter, and weighs 110 tons. It revolves on a shaft that is 27 inches in diameter. The hub of this wheel weighs 15 tons. All else is on the same scale. When this big pumping machinery starts up, all the water likely to be found in the three mines working through the Union shaft — Sierra Nevada, Union Consolidated, and Mexican — will be readily handled. The water now flooding the 2,500 foot level of the Sierra Nevada Mine will be taken out at once. — *The Economist.*

ITALIAN DISCOVERIES AT ESTE. — Some of the finest prehistoric remains in Italy have lately been dug up by Professor Prosdocismi in an ancient cemetery lately discovered near the town of Este. The Romans had, long years ago, rifled some of the tombs, but many of the places of interment were found to be undisturbed, and they contained some valuable stores of pottery and bronzes. The ornamentation, as well as the modelling of the pottery, is considered to be very fine. Great interest has been excited by the figures on the bronzes.

THE PEABODY AND THE WATERLOW BUILDINGS. — The average cost of 954 buildings erected by the Peabody Fund in London was $1,565, while those erected by the Sir Sidney Waterlow Industrial Dwelling Company cost $685, or less than one-half. Hence the former pay but two per cent, and the latter five per cent, while the former are occupied by a much better class of tenants than they were designed for.

THAT HYBRID, AN ARCHITECT. — A draughtsman is not, in the opinion of an English critic, born again when he is called an "architect;" and the deluding prefix of "profession" is a mere vulgarity, intended by this class of business agents to assert some vain superiority to trade. A barrister or surgeon, he says, takes no commission, but his fee, for his professional advice. Artistic workmen would receive their wages, or stipulated pay, according to the value of their art, as business men gain profit or experience loss in trade. But architects pretend to be a sort of trinity in unity, professional, artistic, and commercial, all in one; and such pretence is very business-like.

THE ITALIANS AS WORKMEN. — The workmen who bored the St. Gothard Tunnel were mostly Italians. Many lost their limbs or lives through accidents, but altogether they stood the heat more easily and were less frightened in handling dynamite than the Swiss and Germans. For such enterprises they are classed by those who have seen them work, next to the Chinese.

A BUILDING LAW FOR BALTIMORE. — The mayor has confirmed the appointment of the following named gentlemen to prepare a building law for the city. Mr. John H. B. Latrobe, lawyer; Messrs. John Murdock, Wm. T. Wilson, and Geo. A. Frederick, architects; Messrs. S. H. Adams and Blake, builders.

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Japanese Fans. — A Japanese journal furnishes some interesting information respecting the fabrication of fans. Here, as in many other branches of industry, the principle of the division of labor is rigorously observed. The bamboo sticks are prepared by workmen in their own homes, while the incised ornaments of the lower portion of the fan are confided to more skilful hands, who dress the handles according to the sketches given by the designer. In the same way, the artist gives to the engraver the motives which, in his idea, will prevail the next season, and will ensure a ready sale. He it is also who chooses the colors for the pieces already cut out, as also the colors for each isolated detail, and, finally, the different decorations for the back of the fan. The paper made use of to insert, when pasted, the leaves of the fan is all Japanese; it is peculiarly suited for this purpose — so much so that an attempt to employ foreign paper had to be abandoned. The papers from America were tried, but rejected; but experts will tell one that the native paper used in this branch of industry is much inferior to that used in the past. Formerly, when the country had no relations with the outer world, the most expensive fan made cost scarcely a pound. Since then, however, there have been numerous commissions for much larger sums. The current price of ordinary fans is, for a hundred, from 50 yen or dollars to 15 yen. The number of fans furnished for the Philadelphia Exhibition of 1876. on commission, was no fewer than 800,000, the price of which was estimated at $50,000 (£10,000). Formerly the fan trade rarely exceeded ten thousand articles yearly throughout the whole country, but during the last twelve months, though the date from which this period commences is not stated by our informant, there have been exported nearly three millions of articles from Hiogo and Yokohama. Highly appreciated as are the products of Hiogo, those of Tokio are by far the most esteemed, not alone for their beauty, but for their superior cheapness.

The Billimora Tower of Silence. — The consecration of the new Tower of Silence, built from the subscriptions collected among the Parsees of Bombay and other neighboring towns and villages, took place on March 26, in the presence of a very large number of the members of that community. None but Zoroastrians were allowed to witness the ceremony. Before the business of the day was proceeded with, the people were allowed to inspect the tower. It is an enclosure made of a thick circular wall about seventeen feet high, with a small iron door fixed in the front where the dead bodies are admitted. The floor is lined with Sewree stone slabs of different dimensions, over which the bodies are exposed. There are in all sixty-five such slabs fixed close to each other in a circular form, radiating, as it were, from the centre. In the middle there is a large well or hole, in which the bones and other remains of the bodies collect themselves, and find their way through large apertures into the depths of the ground. It is one hundred and thirty-six feet in diameter, and is therefore considerably smaller than the tower built about two years ago at Nowsaree. There are two other towers at Billimora, one of which was built about three hundred years ago, and the other one hundred years ago. The latter has been used up to a recent date, but in consequence of the walls having been broken in several places, it cannot, according to the Parsee religion, be utilized any longer. It was intimated that some three or four small Towers of Silence were to be built in different villages in Guzerat. The tablet fixed inside the tower bears the following inscription: "This Dokmoo (tower) is built from the general subscriptions collected from the Parsees of Billimora and other out stations for the use of those only who profess the Zoroastrian religion. March 26, 1880." The tower will be used for the first time on the death of a very young child, according to the immemorial custom. — *Exchange.*

Roman Relics in the Bed of the Tiber. — The excavations in the garden of the Villa Farnesina for widening the bed of the Tiber have again yielded several interesting archæological results. A statue of a Roman matron, 1 metre 70 centimetres high, and perfect except for the loss of the left hand, was found a day or two ago, and close by, another statue, of Tiberius, which was, however, in many fragments. Near these a sepulchrum containing several urns was discovered, four of which were of the finest workmanship, decorated with reliefs of fruits and flowers; in other two, besides the ashes and calcined bones found in all, there were two gold rings, with onyx stones, somewhat damaged by fire but still perfect enough to show an intaglio — one of a lion sleeping, the other of three children chasing a bear. It is conjectured that the urns had been previously discovered in the building of the Aurelian wall, which passes by a few steps off, and that the finer urns had been robbed of anything of value, while the plain ones escaped notice. On one of the latter is the inscription: "Minati A. Pollæ." The various articles were almost immediately removed to the museum in the Lungara, where the other objects discovered in the Farnesina gardens have been placed, and carefully kept hidden from the public under the plea that the museum is not yet completed. It should be observed that the Duca di Ripalda, representing the proprietor of the Farnesina, claims compensation for the objects of value discovered on this ground, which was expropriated for the public good, and the price of which has never yet been settled. — *Pall Mall Gazette.*

Fireproof Materials. — In the report published by the *Journal of the Society of Arts*, on the Applied Science Exhibition, Paris, of last year, mention was made of the muslin curtains shown by M. A. J. Martin, Paris, to which a flame was constantly applied without consuming them. The composition heemploys for rendering uninflammable paper, wood, and textile fabrics is the following: —

	Parts.
Pure sulphate of ammonia	80
Carbonate of ammonia	25
Boracic acid	30
Pure borax	17
Starch	20
Distilled or pure water	1,000

The materials are dipped in this solution while hot, so as to be thoroughly impregnated, when they are dried sufficiently to be ironed in the same way as ordinary starched fabrics.

More Notes from the San Donato Sale. — As most of the American purchases were made through my instrumentality, I am able to give a general idea of the class of objects which go to America. As I have already spoken of the pictures acquired by Americans, I will now refer more particularly to some of the more choice pieces of bric-à-brac and special objects of art which also go to the same destination. One of the last sold, but not least in importance, destined to adorn a private house in New York, is the reduced repetition in bronze, made many years since by Barbedienne of Paris, of the Ghiberti doors of the Baptistery of Florence — those famous Gates of Paradise, as Michael Angelo pertinently called them. They cost the Prince in England $20,000, and it took three years to make them. He used them as the entrance to his Gobelin tapestried concert-room, formerly the chapel of his palace. The present owners intend having them gilded, as their originals were, the traces of the gold, after more than four centuries' wear, being still plainly discernible on them. America will also possess some of the finest specimens of the celebrated old Vienna porcelain, the making of which has been discontinued by the Austrian Government on account of its expense. The remarkable dinner service, made up of 107 pieces, decorated with copies of the most celebrated of the old masters of the Belvedere Gallery, beautifully executed, and which cost the Prince $35,000 — for one dish alone he paid $3,300 — was sold by the piece at a very great sacrifice, not a third of the original price. The famous Rubens plate goes to a small country town in Pennsylvania, and not a few pieces of this renowned collection, with choice old bits of Sèvres and Saxon of the best periods of the last century, go to decorate New World homes which hitherto have seen nothing of this select character. Few probably are aware of the prices paid by European collectors for rare specimens of these last-named porcelains, simply on account of some delicate quality of the decoration or paste. There were three small flower-vases of the blue turquoise tint, fan-shaped, painted by Dodin in 1758, which sold for $19,000, and immediately after were resold at an advance of $3,000. The Sèvres snuff-box, No. 476 of the catalogue, painted after a design by Boucher, was eagerly acquired at the price of $6,000 by Baron Rothschild. These values, it is true, are exceptionally fictitious, and are the result of the competition of a few avid collectors, who are willing to pay any price to secure some very rare or choice specimens of certain old workmanship in some fashionable line of the minor arts. When Americans fairly enter the European field of bric-à-brac competition, we may see even more extravagant prices paid, simply for the pride of ownership, irrespective of absolute artistic values. It is with no small satisfaction I am able to chronicle the fact that at least one good, genuine specimen of Luca della Robbia's work, "La Vierge au Cousin," surrounded by a wreath of fruits and leaves, in color, in his usual fashion, goes to New York. There are few of the "old masters" whose names have been more misused than his in the fathering of work which he would not have allowed even to enter his "*bottega*," much less leave it. I was on the point of forgetting, perhaps, the most interesting of all the relics, from its associations with Louis XVI., which hereafter finds its new home in our country. This is the charming iron music-stand, of hammered and repoussé work, which was designed by the King, while he was Dauphin, as a present to Marie Antoinette, and is so lovely a specimen of fine taste and workmanship as to clearly prove that the unfortunate monarch missed his "mission" when he fatally played at kingcraft instead of becoming a *bona fide* artisan, and saving his head. In reading the "San Donato Catalogue," which is a masterpiece of literature of its kind, every one must be impressed with the graceful facility and eloquent suggestiveness with which the French language lends itself to the succinct description of works of art. Our own tongue is lamentably deficient in terms which express the material processes of beauty, especially in fine workmanship and dainty cunning of design. English terms are hard, mechanical, material, unpoetical — do not lend themselves to the sentiment of the objects — and a catalogue of fine art, to give any adequate idea of bric-à-brac of high standard, must borrow from the French language expressions which are either untranslatable into our more rigid, matter-of-fact speech, or else altogether lose their fine æsthetic bloom in the uncongenial change. — *James Jackson Jarves.*

A Novel Railway. — A railway with some novel features has been recently opened between the stations of Ribeauville (on the Strasburg-Basle line) and the town of that name, about two and one-half miles distant. The line is on the road (with which the rails are level) and has a narrow gauge of three feet three inches. There are inclines of one hundred and thirty feet and curves of one hundred and seventy-three feet radius. The train requires only one engineer and one guard. The locomotives weigh nine tons, and among the rolling stock are ten platform cars, which are arranged for conveying cars from the main line without the goods being transferred. These platforms carry two rails corresponding to the normal larger gauge, and they rest on two bogie trucks, having four wheels each. Thus the larger cars can be conveyed over the sharpest curves of the narrow line. These platform cars weigh three tons, and the largest cars, with full charge, weigh fifteen tons, giving a total weight of eighteen tons, which, divided among the four axles, gives a maximum load of only four tons fifty per axle. Passengers, as well as goods, are conveyed upon the line. The total cost of the line has not exceeded $50,000. — *The Railway Reporter.*

An Englishman on American Art. — Americans are no longer content to buy old rubbish from Europe, palmed off as the work of great masters, but seek to encourage their own rising school of artists, many of whom will doubtless take rank some day as masters, even in Europe. It is to be regretted that we know so little of American painting in this country. The book illustrations that come to us in magazines are so good as to make us wish to be better acquainted with the artists. They seem, however, usually to prefer the French *Salon* to our exhibitions for an introduction to Europe. — *The Academy.*

The Bluestone of Texas. — It is said that the soft bluestone rock which underlies a wide part of the prairie region of Texas is fully six hundred feet thick at Sherman.

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BUILDING INTELLIGENCE.

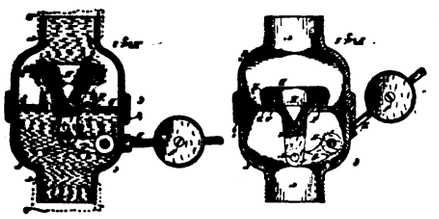
[Reported for The American Architect and Building News].

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

226,476. VALVE AND SEAL-JOINT FOR WASH-STANDS, ETC. — Joseph Bennor, Philadelphia, Penn. The invention consists of a mercurial seal-joint which opens and closes automatically under hydrostatic pressure.



A is the outlet-pipe from a wash-basin, and B the discharge-pipe. C is a coupling, composed of two hemispherical sections, C' C^2, united by male and female threads at c^3. D is a diaphragm which rests on a shoulder, c^3, in the section C^2, formed with a central opening, d, and depending annular flange, d'. E is a valve having a stem, e, which passes up through opening d, and is pivoted to an arm, f, on a rock-shaft, F, which has its bearings in bosses c^4 c^4 formed on the walls of the section C'. This shaft is provided at one end with another arm, F', which is furnished with an adjustable weight, f', designed to hold the valve E up to its seat on the diaphragm D. The valve E has a solid centre, E', of conoidal form, and skirt E^2, which forms a trough for the reception of mercury, and also adapted to receive the depending flange, d', of the diaphragm D, so as to submerge it and thereby form a seal-joint. The operation is as follows: normally the valve is drawn up to its seat against the diaphragm D, the edge of the trough E^2 meeting the latter, and the flange d' entering the mercury. When, however, water flows from the basin in adequate quantity, it will depress the valve sufficiently to permit it to pass down through the waste-pipe B, as shown in Fig. 2. As soon as this is accomplished the weight f' will raise the valve to its normal position, and the seal will be again closed. It will be noted that a double seal is provided; viz., that of the water, which remains above the valve when the latter is closed, and that of the mercury in the trough, below, into which the flange dips. As the water above decreases by evaporation or other cause, the flange will dip more deeply in the mercury. Should there happen to be no mercury in the trough, the water above will form a seal; and should there be neither water nor mercury present, the contact of the upper edge of the trough with the diaphragm against which it seats, such edge being made true, will form a tight joint. In lieu of the counterbalancing-weight, a spring may be used.

227,355. WINDOW AND DOOR PROTECTOR. — Frederick Gould, Canton, Mass.

227,379. ELEVATOR. — John Q. Myers, Waterloo, Io.

227,380. TOOL-HANDLE. — Albert Nawadny, New Orleans, La.

227,397. WINDOW BLIND AND SHUTTER. — H. T Watson, Philadelphia, Pa.

227,401. FIRE-ESCAPE. — Charles C. J. Wood, Chicago, Ill.

227,403. WATER-CLOSET SIGNAL. Delos R. Baker, Cincinnati, O.

227,404. WEATHER-STRIP. — Geo. W. Bell, St. Louis, Mo.

227,411. SEWER-GAS TRAP. — Joseph A. Burgess, Worcester, Mass.

227,412. DRAIN, GAS, AND WATER PIPE. — Mortimer M. Camp, New Haven, Conn.

227,414. DOOR-CHECK. — Charles T. Close, Brooklyn, N. Y.

227,421. HATCHWAY-DOOR MECHANISM. — William I. Ely, Detroit, Mich.

227,438. SAND-PAPER HOLDER. — Chauncey M. Lothrop, Norwood, Mass.

227,446. — WINDOW-SCREEN. — Jacob Reigart, Steelton, Pa.

227,452. BENCH-PLANE. — William Steers, Sherbrooke, Can.

227,459. STAIRWAY ELEVATOR. — John I. Tay, Oakland, Cal.

227,466. CURTAIN-CORNICE. — Hans H. Winger, Chicago, Ill.

227,500. IRON-PLANER TOOL. — Harlow Dewey, Westfield, Mass.

227,532. BLIND-SLAT OPERATOR. — Noah M. Hutton, Quincy, Ill.

227,533. SHUTTER-WORKER. — Noah M. Hutton, Quincy, Ill.

227,545. FIREPLACE FENDER. — James H. Kizer, Covington, Ky.

227,562. SASH-LOCK. — George H. Metzger, Buffalo, N. Y.

227,571. — LUMBER TALLY. — John L. Paxon, New Hope, Pa.

227,575. KITCHEN SINK. — Frederick Rauscher, West New Brighton, N. Y.

227,576. WATER METER AND MOTOR. — Charles A. Reed, Bridgeport, Conn.

227,578. DIVIDERS. — Charles F. A. Reimann, Pine Bluff, Ark.

227,582. VISE. — Wilson Riley, Keighley, England.

227,586. VENTILATOR. — Walter S. Sayers, Guelph, Ont.

227,587. LATCH-LEVER. — George H. Sargent, New York, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Louis Henneyhauser, 2 three-st'y brick buildings, on Charles St., near Hill St.

Wm. Collet, 8 three-st'y brick buildings, on Fulton Ave., between Franklin St. and Edmonson Ave.

Levy Conden, 11 three-st'y brick dwells. on Fulton Ave., near Winchester St.

Miss Elizabeth Harwood, three-st'y brick building, 132 Lexington St., between Park and Howard.

Charles Rockafeller, 10 three-sty brick dwells., on Townsend St., near Mount St.

Chas. Rockafeller, 7 three-sty brick dwells., on Mount St., near Townsend.

Elizabeth Whalen, three-st'y brick building, 53 Raborg St., near Pine.

Francis Denmead, five-st'y brick warehouse, on W. Falls Ave., near Black St., 47' x 47'.

INSPECTION OF SCHOOL-HOUSES. — A resolution was offered in the City Council, May 14th, instructing the Inspector of Buildings to confer with the School Commissioners in regard to the ingress and egress in school buildings in case of fire, and report to the City Council what alterations are necessary to remedy existing defects, and the probable cost of such repairs. The resolution was adopted.

IRON TRADE. — The iron merchants report business in their line, both here and elsewhere, at an almost complete standstill. They attribute it to an over-importation of iron from Europe, 400,000 tons having been brought over since January 1st to this country, prices in some cases having fallen off from $18 to $20 from the top figures touched during the big boom. A steamer, arrived last week with 2,300 tons of iron ore, is at Quarantine grounds, discharging into canal-boats which will carry the cargo to Philadelphia. The consignees were unable to place it on the market at a fair price, owing to the large quantities on hand.

STOCK EXCHANGE BUILDING COMPETITION. — The competition for the new building for the Stock Exchange was decided on Wednesday May 12, in favor of the designs submitted by J. A. & W. T. Wilson, architects. The new building is to have a frontage of 48 feet on German St., near South. It will contain brokers' offices on ground floor, and the main hall with gallery on second floor. The materials are to be pressed brick, red terra-cotta, and Cheat River blue-stone.

THE NEW BUILDING LAW. — The mayor has appointed six gentlemen to act as an unpaid commission to frame a general building law for the city of Baltimore. Three of the gentlemen are prominent architects, two are builders, and one an attorney.

WAREHOUSE. — Mrs. B. Weisenfield is building a large four-st'y brick and stone warehouse, 23' x 75', on the northwest corner of Howard and Lombard Sts.; cost, $10,000.

Boston.

BUILDING PERMITS.—*Brick, 526 Commercial St.*, for R. and A. Burnett, 1 dwell., 29' x 31', four stories; J. Kelly, builder.

MEDICAL SCHOOL BUILDING.—The corporation of the Harvard Medical School has decided to locate the new building on the westerly half of the square bounded by Boylston, Exeter and Dartmouth Sts.

Brooklyn.

BUILDING PERMITS. — *Hewes St.*, 7 two-st'y brown stone dwells., 19' 2" x 42'; owner, John F. Ryan, 142 Rodney St.

Kent Ave., 1 two-st'y brick mill, 57' x 50'; owners, Goodwin, Cross & Co., 45 Clason Ave; architect, W. H. Gaylor.

Carleton Ave., cor. St. Mark's Ave., 2 three-st'y brown stone, one store and dwell., 22' x 50' and one dwell., 20' x 45'; cost, $12,500; owners and builders, Lambert & Mason, 226 Clermont Ave.; architect, J. H. Mason.

Eighth St., 4 two-st'y and basement brown stone dwells., two 17' x 40', and two 13' x 45'; cost, each $3,500; owner, William Taylor, 83 Third Place.

Third St., 12 three-st'y brown stone dwells., 18' 3½" x 50'; owners, J. P. Kinney & Co.; architects, Parfitt Bros.

Washington Ave., 3 three-st'y brown stone dwells., 18' x 45'; owner, W. C. Bowers; architects, Parfitt Bros.

Court St., 2 four-st'y brick stores, one 42' and one 21' front by 75'; owner, E. S. Litchfield, State St.; architect, Carl F. Eisenach.

Garden St., cor. State St., 9 three-st'y brown stone dwells., 19' 3" x 43' 3"; owner, J. W. Dearing, 434 Henry St.; architects, Parfitt Bros.

Nelson St., 2 three-st'y brick tenements, 20' x 40'; owner, Michael Kelly, Hamilton Ave., cor. Nelson St.; builder, Thos. Keogh.

Greene Ave., No. 273, 1 two-st'y brick factory, 25' x 87', and 1 two-st'y brick stable, 25' x 25'; cost, about $7,200; owners, Dennison Manufacturing Co.; architect, William B. Tuthill; builders, Cornelius King and W. H. Tunison.

Hooper St., 2 three-st'y brown stone dwells., 20' x 42'; cost, about $4,800 each; owner, etc., James Sheridan, 216 Lee Ave.

Union Ave., cor. Scholes St., 1 two-st'y brick church, 50' x 100'; cost, $20,000; owners, Trustees St. Peter's German Church; architect, L. B. Valk; builders, Henry Grassman and Edward Gustaveson.

Chicago.

BUILDING PERMITS. — T. L. Kempster, four-st'y factory, 111inois St.; cost, $25,000; and a five-st'y factory, Indiana St.; cost, $55,000.

Board of Education, three-st'y school-house, cor. Lincoln and Thirty-Fifth Sts.; cost, $30,000.

Hicks Bro., 2 three-st'y stores and dwells., 916 and 918 West Lake St.; cost, $8,000.

Alexander Watson, two-st'y dwell., Hinman St., near Wood; cost, $3,000.

C. Warnecke, two-st'y dwell., 202 Townsend St.; cost, $5,000.

John Vierke, two-st'y dwell., 585 and 587 Paulina St.; cost, $3,500.

Chicago, Alton & St. Louis Railroad Company, freight house, cor. Charles and Van Buren Sts.; cost, $9,200.

S. C. Judd, two-st'y dwell., on Delaware Pl., near State St.; cost, $12,000.

R. Sheppard, 3 two-st'y dwells., 174 and 176 South Green St., cost $10,500; 2 two-st'y dwells., 187 and 189 South Green, cost $7,000; and 2 at 524 and 526 Lake, cost $7,000.

C. & W. I. R. R. Co., freight house, cor. Twelfth St. and Third Ave.; cost, $30,000.

Belton Halley, cottage, 3,517 Portland ave.; cost, $2,000.

Cleveland, Ohio.

DWELLINGS. — Eleven frame houses on Perry St., for O. H. Payne; cost, $3,000 each.

A frame house on Dunham Ave., for H. C. Hawkins; cost, $7,000.

A frame house on Franklin Ave., for J. H. Shultz; cost, $3,500.

Alterations of brick house on Prospect St., for J. A. Vincent; cost, $3,500.

Alteration house on Euclid Ave., for F. H. Penfield; cost, $3,000.

Frame house on Scoville Ave., for Wm. H. Brown; cost, $3,500; Coburn & Barnum, architects.

New York.

ALTERATIONS. — *Grand St., No.* 133, cor. Crosby St., to be changed into an office building, interior alterations; cost, $5,500; owner, Citizens' Gas Light Co., N. E. cor. Sixteenth St. and Union Sq.; builder, John H. Williamson.

Second Ave., No. 65, to be changed into an apartment house, to be raised to four stories, a four-st'y brick extension on rear, 24' x 100', and interior alteration; cost, $5,000; owners, Johnston Bros.; architect, Wm. José.

Stanton St., cor. Eldridge St., to be raised to four stories, and a four-st'y brick extension on rear, 18' 10" x 24', also interior alterations; cost, $8,000; owner, John Martin Schuh; architect, Chas. Sturtskober.

West Twenty-Third St., No. 42 one-st'y and basement extension on front, 21' 8" x 9'; cost, $2,000; owner, W. Jennings Demorest; architect, W. Jones; builders, Jones & Co.

Grand St., Nos. 392, 394 *and* 396, full stories to be made of attics, and damage by fire repaired; cost, $4,000; owner, Mrs. Brady; architect, P. O'Reilly; builders, Gibb & O'Reilly.

East Thirty-eighth St., No. 110 three-st'y brick extension, 8' 6" x 8' 6" on rear, and interior alterations; cost, $5,000; owner, George N. Sears; architect, Henry F. Cooke.

West Thirty-Ninth St., No. 58 two-st'y brick extension; 13' x 20' on rear; cost, $4,000; owner, Robert W. Nesbit; masons, N. & H. Andrus; carpenters, Jas. C. Hoe & Co.

Bowery, Nos. 165 *and* 167 (theatre), the front portion of present peak roof to be changed to flat, a new gallery built, and internal changes; cost, $2,500; owner, Harry Miner; architect, Henry Dudley.

Broadway, Grace Church, three-st'y brick extension; cost, $28,000; owners, rector, church wardens, and vestry; architect, James Renwick; builders, Owens & Canfield and Smith & Crane.

North Washington Sq., No. 20, to be changed into an apartment house, and building raised to four stories, a four-st'y brick extension, 12' x 80', also internal alterations; cost, $25,000; owner, Estate of Geo. P. Rogers; architect, H. J. Hardenburgh.

Wooster St., No. 74, three-st'y brick extension on rear, 25' x 20', also internal alterations; cost, $2,000; owners, Archer & Pancoast; builder, Patrick Childs.

Nos. 167 *and* 169 *Chambers St.*, are to be altered from dwellings into stores, at a cost of $16,000; Rd. Deeves, mason; Havilah M. Smith, carpenter.

The house of Dr. Otis, on *Thirty-fourth St.*, is to be raised one story and an extension added; Messrs. Gambrill & Ficken, architects; Mr. Rd. Deeves, contractor.

Below *Wall St.*, on Broadway, a number of stores are undergoing alterations, the most important being Nos. 72 and 74, which are to be made into one.

BUILDING PERMITS. — *East Nineteenth St., No.* 11 1 four-st'y brick (iron front) store, 20' x 77'; cost, $15,000; owner, Robert Goelet, 261 Broadway; architect, Geo. Mulligan; builder, Marcus Eidlitz.

Fifty-fifth St., 2 four-st'y brick (granite front) dwells., one 33' x 33' and one 17' x 95' 5"; cost, $40,000 and $20,000 respectively; owner, Charles T. Barney, 101 East Thirty-Eighth St.; architects, McKim, Mead & White; mason, L. N. Crow.

Mott Ave., cor. One Hundred and Fiftieth St., 5 three-st'y brick dwells., each 19' x 36'; cost, $5,500 each; owner, Charles E. Van Tassel, Walton Ave. and One Hundred and Fiftieth St.; builder, J. G. Van Tassel.

One Hundred and Fifty-First St., 1 two-st'y brick dwell., 20' 6" x 42'; cost, $3,500 each; owner, John Buse, on premises; architect, John Brandt.

Twelfth Ave., 1 one-st'y brick engine and boiler house, 75' x 20' and 34'; cost, $7,500; owner, N. Y. C. & H. R. R. Co.; architect, F. S. Curtis.

King St., cor. Greenwich St., 1 five-st'y brick factory, 50' x 100'; cost, $16,000; owners, Gordon & Dilworth, 575 Greenwich St.; architect, Charles Reekil.

Fifty-fifth St., 5 three-st'y brick (brown stone front) dwells., 18' x 60'; cost, $8,000 each; owner, Brian McKinney, 1347 Third Ave.; architect, B. Muldoon.

Fifth Ave., 1 four-st'y brick (brown stone front) dwell., 25' x 97' 4"; cost, $45,000; owner, E. Frank Coe, 47 Bedford Ave., Brooklyn; architects, Thom & Wilson; builder, William B. Pettit.

Bowery, No. 169, 1 five-st'y brick office building and store, 23' 5½" x 52'; owner, Harry Miner; architect, Henry Dudley.

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Greene St. Nos. 129 *and* 131, 1 five-st'y brick store, 50′ 6″ x 96; cost, $44,000; owner, Dr. John C. Barron, 17 Washington Pl.; architect, D. Lienau; mason, Freeman Bloodgood; builders, Havilah M. Smith & Son.

Fifty-fifth St., 1 four-st'y brick (brown stone front) dwell., 25′ x 60′; cost, $39,000; owner and builder, John C. Donnelly, cor. Fiftieth St. and Lexington Ave.; architect, James E. Ware.

Fifty-Sixth St., No. 142 *East,* 1 two-st'y brick stable, 25′ x 70′; cost, $3,500; owner, Jesse Baldwin, No. 119 East Fifty-Seventh St.; architect, W. B. Baldwin; builders, Peter Tracy, and Hall, Hatt & Parker.

One Hundred and Thirtieth St., 7 three-st'y brick dwells., 17′ 9″ x 50′; cost, $6,500 each; owner, E. S. Higgins, 84 White St.; architect, John F. Miller; superintendent, Thos. Wilson.

Fifty-Fourth St., 1 two-st'y brick stable, 25′ x 80′; cost, $8,000; owner, Joseph Doelger, 228 East Fifty-Fourth St.; architect, Julius Kastner.

Fifty-Third St., 3 brown-stone-front five-st'y apartment houses; each 25′ x 67′; cost of each, $14,000. Eugene Parker, architect.

Third Ave., cor. Eighty-Sixth St., a brick four-st'y factory and store, 51′ x 57′; cost, $14,000. Spies & Brother, owners; E. Sniffen, architect.

Third Ave., cor. Eighty-seventh St., brick store, three-st'y and dwell., 26′ x 60′, cost, $12,000; Charles F. Southmayd, owner; John C. Donnelly, architect and builder.

Sedgwick Ave., a two-st'y frame hotel, 75′ x 25′; cost, $2,500; Cornelius Stone, owner; A. B. Ogden, architect.

Eighty-Sixth St., 2 brick four-st'y tenements, each 25′ 6″ x 78′; cost, each $9,000; Johnston & Brothers, owners; A. B. Ogden, architect.

Sixty-Fifth St., 110′ east First Ave. (rear), brick two-st'y stable, 100′ 5″ x 23′; estimated cost, $3,500; A. Dowdey, owner; F. S. Barnes, architect.

Apartment House.—At an expense of $25,000, No. 20 North Washington Square is to be made into a first-class apartment house, containing suites of rooms to rent for $3,000 per annum; Mr. H. J. Hardenbergh is the architect.

Factory.—On Grand St., near Mott St., a lot, 50′ x 70′ is being torn down, and foundations are to be laid by Mr. Rd. Deeves. On the ground a six-story factory is to be built for the "Scriven" estate, from designs of Messrs. Potter & Robertson.

Flats.—Messrs. Herbert, Pirrson & Co. are drawing plans for flats on Eightieth St., corner Lexington Ave., 30′ x 90′, four stories high.

Hotel.—On Eighteenth St., corner of Fourth Ave., a hotel, 53′ x 144′ is to be built for Mr. Wehrle.

Office Building. — Messrs. Joel B. and John A. Post are to build, at 18 Exchange Place, an office-building, 85′ on Exchange Pl., 53′ 4″ on Hanover St., 98′ 2″ on Beaver St., 103′ 4″ on the rear line, and 110′ in height. The building is to be of light buff brick, with terra cotta finish. The cost will be between $200,000 and $300,000. Mr. Geo. B. Post is the architect.

School House. — Mr. L. J. O'Connor is preparing plans for a school-house for the Cathedral Parish to be built on Fiftieth St., between Lexington and Fourth Aves. The building will be of brick, 80′ x 100′, four stories high with basement; it will cost between, $50,000 and $60,000.

Store.—Messrs. H. J. Schwarzmann & Co. have drawn plans for the five-story store, 50′ x 100′, which is to be built for W. Myers on the corner of Hester St. and Bowery, at a cost of $30,000. The building will be of brick with stone finish.

Theatre.—Abbey's Park Theatre is to be enlarged and improved from designs of Mr. S. J. F. Thayer, of Boston.

Philadelphia.

Bank Building.—303 *Chestnut St.*, add. to banking house for C. Glendenning; cost, $7,500; contractor, Oliver Bradin; G. W. Hewitt, architect.

Factories.—*Hancock*, cor. Edward St., four-st'y factory, 42′ x 66′; Rob't Bishop & Sons, owners.

621 *and* 623 *Aramingo St.*, add. to factory, 30′ x 34′; owners and builders, Albert Shoenhut & Co.

Baltimore Ave. and Sixtieth St., 1 three-st'y factory building, 75′ x 140′; owner and builder, George Callaghan.

Houses.—*Filbert St.*, 3 two-st'y dwells.; M. De Haven, owner.

South St., 3 two-st'y dwells., 15′ x 30′; owner, M. De Haven.

527 *and* 529 *Christian St.*, 2 three-st'y dwells., 17′ x 50′; owner, H. R. Maxwell.

Twelfth St., near Iaska, 1 two-st'y dwell., 16′ x 44′; owner and builder, Andrew Miller.

Leamy St., south of Lehigh Ave., 1 three-st'y dwell.; owners, Catholic Church; architect, E. P. Durang; 60′ x 40′.

1742 *Market St.*, add. to back building, 26′ x 80′; contractor, H. Doan.

Ludlow St., east of Fortieth St., 2 three-st'y dwells., 12′ x 33′; builder, Wm. Gill.

Thirty-fifth St., 2 three-st'y dwell., 16′ x 32′; builder, Robert Manley.

Allegheny Ave., 7 three-st'y buildings, 16′ x 32′; builder, Robert Manley.

Hancock St., 1 two-st'y dwell., 18′ x 30′; builder, Sam'l Henderson.

Diamond St., 16 three-st'y dwells., 16′ x 55′; owner and builder, A. R. Schoch.

Hancock St., two-st'y dwell., 21′ x 60′; owner and builder, A. Woll.

Forty-third and Walnut Sts., 6 three-st'y houses; owner, Henry L. Gaw, Jr.; cost, $48,000; architect, G. G. Hewitt.

Laboratory.—*Cor. Rush and Amber Sts.*, 1 laboratory, 25′ x 32′.

Stables.—1005 *Lehigh Ave.*, 1 two-st'y stable, 20′ x 45′; owners and builders, Green & Matthews.

Sixth St., near Dauphin St., 1 one-st'y stable, 19′ x 145′; builder, E. Conrad.

Morris, cor. Marshall St., 1 stable, 40′ x 30′; owner and builder, A. Rittenhouse.

Stores.—*Twentieth*, cor. Callohill St., 4 three-st'y stores, 17′ x 64′; builder, A. A. Catnach.

4025 *Lancaster Ave.*, 1 store and dwell., two stories, 17′ x 49′; builder, D. McGanigle.

Filbert, cor. Filbert Alley, 1 three-st'y store, 21′ x 207′; owners, Strawbridge & Clothier; contractor, Balderston & Hutton.

312 *South Second St.*, three-st'y store and dwell., 16′ x 60′; builder, Wm. Scott.

San Francisco, Cal.

Building Permits. — 1 two-st'y and basement frame building, Mission St., between Sixth and Seventh; owner, S. P. Collins; cost, $5,650.

One two-st'y frame, Bush St., between Gough and Octavia; owner, Joseph Getz; cost, $9,500.

Brick building on Summer St., near California Market; owner, R. J. Tchav; cost, $4,200.

St. Louis.

Building Permits. — Thirty-four permits have been issued since our last report, three of which are for frame structures of slight importance. Of the remainder, those worth $2,500 or more are as follows: —

Owners Name.	Use.	Stories.	Rooms.	Cost.
H. Scholz,	Dwell.	2	6	3,500
Union Warehouse Co.,	Wareh'se.	2	2	3,000
Mrs. William McKee,	Dwell.	3	10	12,800
R. Miller,	Dwell.	2	7	3,500
J. Wiley,	Dwell.	2	8	3,500
Henry Shaw,	Store.	2	2	3,000
L. Gundecker,	Dwell.	3	3	15,000
Andrew McKinly,	Store.	2	2	7,000
Mrs. M. D. Hitchcock,	Store.	4	4	3,000
M. Kinkwood,	Store.	2	5	6,000
J. Hammond,	Dwell.	2	10	10,000

General Notes.

Albany, N. Y. — Mr. W. M. Woollett is the architect of the new church to be built for the Calvary Baptist Society, on High St.

Ansonia, Conn. — Messrs. Brown & Stilson, architects, of New Haven, are building a house for W. O. Wallace, Esq.; cost, $6,000.

Augusta, Me. — A new building for the female patients is to be built on the Insane Asylum grounds, at Augusta; not to exceed $18,000 in cost.

Billerica, Mass. — At a recent town meeting in Billerica the offer of Mrs. Joshua Bennett to give $5,000 for a building for a town library, on condition that the town give the same amount, was declined with thanks.

Bismarck, D. T. — P. J. Pauly & Bro. are the architects of the new court house and jail now building, at a cost of $20,000.

Cambridge, Mass. — The Hasty Pudding Club is discussing the possibility of building a club-house. Messrs. Cabot & Chandler, of Boston, have submitted sketches.

Cleveland, O. — Blackburn & Charlot, architects, have made the plans of a building for the Cleveland Baking Company. It is to be of brick, four stories high, and will be 143′ x 43′. They are also engaged in sketching a plan for a fire-proof building for the Cleveland Provision Company, which is to be two stories high.

Delaware, O. — House for W. Little; cost, $8,000; Coburn & Barnum, architects, Cleveland, O.

Detroit, Mich. — Excavating for the foundation for the new building of Francis Palms, on Jefferson Ave., is nearly completed.

The supply of brick made last season having been used up during the winter, building this spring has been somewhat delayed. The new brick is now beginning to come into market. Although the demand for brick for local use and for shipment is at present greater than the supply, prices remain low.

Harvey's Lake, Pa. — Mr. A. Hunlock is building a frame cottage, costing about $4,000, from plans by J. H. W. Hawkins, architect, of Wilkesbarre, Pa.

Haverhill, Mass. — A house for Mrs. Houston West will be soon completed, at a cost of $7,000. Currier & Killan are builders. Mr. Newcomb, of Boston, is the architect.

Holyoke, Mass. — The Sisters of Charity are to build a frame hospital and orphanage.

Louisville, Ky. — The Newcomb-Buchanan Distilling Company is to build a one and a half-story brick warehouse on the southwest corner of Gregory and Hamilton Aves.; cost, $35,000.

Edward Hardy is to alter a two and a half-story brick dwelling on College St., between Brook and Floyd; cost, $5,500.

W. O. Dodd is to build a three-story brick and stone dwelling, cor. of Fourth and Kentucky; cost, $15,900.

A. J. Ballard is to build a three-story brick mill on Linden street, between East and Floyd; cost, $5,000.

William G. Meier & Co. are to build a one-story brick tobacco warehouse on Fifteenth and Magazine streets; cost, $8,000.

Lynn, Mass. — The question of building a city hospital is now being agitated.

Meriden, Conn. — Messrs. Brown & Stilson, of New Haven, are the architects of Hon. J. C. Lewis's house; cost, $12,000.

They are also to alter the houses of M. Hubbard, Esq., and N. L. Bradley, Esq., at a cost of $5,000 and $3,000 respectively.

Monument, Col. — The Presbyterian Society is making preparations to build a church shortly.

Nashua, Ia.—It is proposed to raise $25,000 to build a Court-House, if this town is to become the County seat for Chickasaw County.

New Dorp, N. Y. — A new parsonage is to be built for the old Moravian church.

Oberlin, O. — Dwelling for A. A. Wright; cost, $3,000. Coburn & Barnum, architects, Cleveland, O.

Pittston, Pa.—P. McCanna is building a brick block, 30′ x 85′, three stories; Fred J. Amsden, architect.

Pleasanton, N. J.—Episcopal chapel; cost, $3,000; contractor, James Wilson; architect, G. W. Hewitt.

Portland, Conn. — Father Desmond's house is being altered, at a cost of $5,000, by Messrs. Brown and Stilson, architects, of New Haven.

Princeton, N. J. — Work on the Marquand Chapel for Princeton College will soon begin.

Sandwich, Mass. — A cottage for J. L. Wesson is now building, from drawings of Mr. Newcomb, architect, of Boston. Joseph Hall is the builder; cost, $4,000; open timber-work.

A house for E. I. Swan will soon be built; contract not yet let.

A spire, with other improvements, is being added to the Unitarian church; all under the direction of Mr. Newcomb.

Scranton, Pa. — The Lackawanna County Commissioners are to build a county jail.

Stanford, Ky. — Over $3,000 have been secured for a new Christian church.

Troy, O. — Foundations are laid for a double brick dwelling for Mr. L. F. Dillaway, from plans by Messrs. Peters & Burns, architects. Building prospects fair.

Waterbury, Conn. — James Crompton is soon to build a cottage.

Westfield, Mass. — The corner-stone of the new Episcopal chapel, on King St., was laid Saturday. Only the foundation of the tower is to be laid at present.

Worcester, Mass. — Mr. H. W. Eddy is building for E. W. Lincoln, Esq., a pair of brick houses, 50′ 56′.

Industrial.

Amherst, Mass. — It is expected that both the Hills Company and H. D. Fearing & Co. will rebuild their hat factories, and work will be commenced soon.

Beaver Falls, Pa. — The File Works, recently burned, are being rebuilt.

Campello, Mass. — George E. Keith has broken ground for a new factory, 30′ x 130′, four stories high.

East Hampton, Conn. — The Merrick & Conant Manufacturing Company are building a silk factory here.

Fall River, Mass. — Ground has been broken for an extensive addition to Eddy's woolen mill, 122′ x 50′, four stories high. The contract for mason work has been awarded to Mr. John J. Highlands, and for furnishing the granite, to Wm. Beattie.

Holyoke, Mass. — Buchanan, Bolt & Co. are going to carry out their plans for extending their Fourdrinier wire-cloth works at once.

Indianapolis, Ind. — Ground was broken last week for a new elevator.

Lynn, Mass. — Miner & Brother are to build a new brick shoe manufactory in rear of their present factory. The structure will be 80′ x 80′, and five or six stories high.

Nevin, Ill. — A new flour mill is being built by Lycan & Co.

North Adams, Mass. — The Johnson Manufacturing Company has begun a 100 feet brick addition to its mill.

North Attleboro', Mass — It is expected that H. F. Barrows will soon commence to build a large jewelry manufactory.

Northampton, Mass. — Leroy Lewis has put in the foundation for Belding Brothers' new silk mill, and is now putting in one for a silk mill at Florence, Conn.

Philadelphia, Pa. — Homer Brothers, carpet manufacturers, are putting up a large factory, covering the block from Lehigh Ave. to Somerset St., between Lithgow and Lawrence.

Phœnixville, Conn. — A new mill is to be built for the manufacture of twine, and will be run by E. M. Smith. It will cost $5,000.

Troy, N. Y. — D. E. Paris & Co, stove makers, are putting up an addition, 75′ x 61′.

Waterbury, Conn. — A portion of Holmes, Booth & Hayden's factory, which was burnt last February, is being reconstructed under direction of Albert M. West, architect; with additions will cost about $10,000.

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THE New York Building Department is not gaining much credit by its conduct since the Madison Square Garden catastrophe. Mayor Cooper some time ago requested the Department to send him for consideration the original plans and specifications for that building, which were filed at the office. Instead of this, copies were sent him, which he found reason to believe were not accurate transcripts of the originals. Requesting again that the original documents should be sent, he was answered through the counsel for the Department that they could not be allowed to leave the custody of the officers in whose charge they were, except on demand of a court of record. Mayor Cooper is a man who does not like to be trifled with, so a peremptory command was issued to the superintendent to appear before the mayor on a certain day, and bring the papers with him. This was done, and one of the causes for the unwillingness to exhibit the records was at once apparent; the alleged copy was found to be falsified in at least one particular: the records called for a wall thirty-four feet high, the copy read "twenty-four." Meanwhile, with the usual violence of the feeble in endeavoring to correct the consequences of their own inefficiency, the Department has ordered the remaining walls of the Madison Square Garden to be taken down, and the customary course of refusal and arbitration has commenced. Although this order is in accordance with the recommendation of the coroner's jury, it will seem to most experts strange that the supreme authority in matters of construction for the city of New York could not devise a system of buttressing which would make the walls absolutely secure without compelling the owners to demolish them, only to rebuild them in a manner which would not be likely to render them any safer than they could easily be made without incurring so large a loss of time and money. The owners have not shown any wilful neglect or disregard of the public security, and there is no excuse for wantonly putting them to needless inconvenience.

SENATOR MORRILL of Vermont, who by his long experience in Congress has gained a right to be respectfully listened to when he speaks of matters which concern the daily life of the national Legislature, has made some sensible remarks upon the bill for providing additional accommodations for the Congressional Library, which came lately before the Senate. Most of our readers know that some years ago a strong effort was made, at the instance of Mr. Spofford, the Librarian of Congress, to secure the erection of a building adequate to the accommodation of what is rapidly becoming one of the largest, and by its copyrighting function the busiest library in the world. Plans were advertised for and received, but nothing definite was done. The proposed removal of the library from its present accessible quarters in the Capitol did not please some members of Congress, who were not content with the reference collection which it was intended to leave there, and several schemes were perpared for constructing a wing, or rather L, projecting from either the east or west front of the building, the library to be placed in this, or the Senate or House to take possession of it, and the library to occupy the quarters thus vacated. Against this scheme Senator Morrill advances many weighty objections, urging that such an addition, on either side, would ruin the effect of the Capitol, while the capacity of even the largest practicable extension of this kind would be inadequate to the future wants of the library, and deprecating any removal of the Senate or House of Representatives from the rooms in which they are now housed with ample dignity and a degree of comfort and convenience not surpassed in any legislative halls in the world. We trust that these arguments will prevail, and that to Senator Morrill will succeed others equally able, who may long continue to defend the noble and daily increasing beauty of our national Capitol from the attempts of thoughtless or ignorant innovation.

Two failures of buildings have come to our knowledge since our last writing. One was the result of a very common kind of carelessness, which foremen and architects should look out sharply for. The structure was in process of demolition, and four men were in the fourth story cleaning brick, which they piled up beside them as they worked. Laborers of the class usually employed at such tasks have little capacity for reflection, and their united labors soon heaped up around them a weight which the floor-beams were unable to resist, and they broke, overturning the wall with them, and the whole mass went through two more floors. One man only was seriously injured. By the other accident, the lives of fifteen men were endangered, and four men were severely hurt. As workmen were covering the roof of a large hall with tarred paper, the foreman observed a depression in the middle of the surface, and immediately afterward the roof fell to the cellar. The local papers attribute the catastrophe to "causes unknown," the contractor being, as they say, "skilled and competent." We may therefore regard the collapse as a miraculous interference of Providence with the natural laws which govern the force of gravitation and the transverse strength of beams. As, however, the structure is to be rebuilt, we will suggest to the "skilful contractor" the propriety of making a few mundane calculations as to the weight which his roof-beams may be expected to carry safely independent of supernatural interposition. Then he will at least be in a position to avoid such personal mishaps as a conviction of manslaughter in case of a second "accident."

A PETITION has been presented to Congress by the Washington Monument Association, praying that the Government will lend its influence to promote the completion of the monument according to the plan which we described and illustrated some months ago. In the hope of furthering an object laudable enough in itself, some of the daily newspapers make assertions hardly in accordance with the facts. It is not justifiable, for instance, to try to gain credit for the Monument Association by saying that it contemplates carrying out the original design of the structure: its scheme is, from an artistic point of view, utterly different. It is doing no honor to the memory of Robert Mills and his employers, but the reverse, to pretend that his noble conception of an obelisk, six hundred feet high, not standing on a commonplace plinth, but rising from a colonnade, itself of gigantic proportions, and to which impressiveness and scale were given by contrast with its sculptured ornaments, is fitly carried out by a pile of stone five hundred feet high instead of six hundred, without base, colonnade, or sculpture. One might as well say that the design of an equestrian statue could be substantially rendered by a torso without head, arms or legs, placed upright in the grass, because economy forbade the outlay necessary for providing the horse and limbs. We do not quarrel with those who find "deep harmonies" in stumps of any kind; indeed, it is perhaps patriotic to try to conceal the ugly baldness of the present monument by pretended symbolisms and mystic significations, but it is hardly fair to father either the ugliness or the apologies for it on the original designers.

THE Archæological Institute of America is gradually acquiring a firm establishment. Funds are coming in, and an active and enthusiastic membership gives sure promise of success in the great field which lies before it. Of all the liberal pursuits which may some time be popularized among us, that of archæology will perhaps be the most beneficial in its influence. The American character is self-confident, unsympathizing, narrow, not from want of feeling, but because its imagination is so little

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stimulated, and its experience so circumscribed; and of all means to correct this fault, the study of antiquity is perhaps the best. Of the two branches of this study, history and archæology, the latter is perhaps most adapted to the national temper. To say nothing of the footing of comparative equality on which all persons meet before the impenetrable veil which covers the prehistoric periods, the study of actual remains excites the ingenuity and practical sense in which our countrymen are thought to excel. Our native resources in the way of material are not large, but an almost virgin field is open to us in Central America and Mexico, from which we can stock museums enough to afford study and instruction for all who desire it, and many European and Asiatic remains have found their way here. We should be glad to see every village library forming the nucleus of a collection of its own. It would not be long before each one would have collected some special treasures, and created its little group of students.

Signor Brumidi's work in the Capitol at Washington does not easily find hands to carry it on. Independent of the question whether it is worth while to pursue it any further, it seems probable that the secret of the peculiar style of art which he thought suitable for the frieze of the Rotunda has perished with him. We need not repeat our own opinion, that although Signor Brumidi's work in other parts of the building quite justifies his reputation as an artist, the singular conceit which he so laboriously endeavored to carry out on the wall of the Rotunda was quite unworthy of him, and that the kind of artist who could most fitly succeed him in that place would be that industrious worker in whitewash, who would most quickly restore a virgin field for future decoration more worthy of the building. Since the lamented death of Hunt, the name of La Farge stands *facile princeps* among all those artists who have yet undertaken any considerable work of the kind. We gladly give the Committee on Public Buildings and Grounds the credit of being sincerely desirous of doing the best thing possible for the public, but we know the difficulties of such committees, besieged by "influences" of all kinds in behalf of rival candidates, and desirous of avoiding all suspicion of partiality. In such cases it is not surprising if sometimes they fly from the combats of the powerful, and seek safety without glory in putting forward a harmless "dark horse," too insignificant for any one to have a grudge against which they can visit upon the heads of those who appoint him.

There are, however, better things than having "dark horses" exclusively to do the national fine art, and we will venture to point out a way by which the committee could probably secure a creditable result without much offending the sensibilities of their fellow magnates who wished to push their friends and *protegés* at the national expense. This way would be a general competition, in which all would enter on the same footing, with a reasonable prospect that the best, or one of the best, would gain the prize. Such a competition is by no means a novelty, and those who have seen the noble sketches of the late William Hunt for his work at Albany, will readily perceive how slight a drawing need be required of each artist to show the inspiration and the scheme of color which form the two essential elements of such a design. It would be easy to appoint a jury whose award could not be questioned; and a well-considered invitation would arouse the enthusiasm of all the artists of the country. We should be decidedly in favor of allowing Americans only to enter the lists, for two reasons: first, because the American artists, not yet formed into anything like a national school, but almost to a man imitators of foreign masters, feel an undue awe of the famous foreigners, and would be disheartened at the prospect of competing against those great names, even though the jury were not awed by them; and secondly, because such a competition affords a rare opportunity for awakening the germs of a truly national art, and the restriction of the privilege to those who can feel the pride of American birth, and share the sympathies of American citizenship, would stimulate the imaginations of some competitors, at least, for once beyond mere technique, and perhaps kindle a flame which would blaze for a long time to come. The task is by no means a complicated one: the forms and the lighting of the rotunda and dome are simple, and a lithographed section in bare outline, with the development of a portion of the surface, would give all the artist would need to direct his imagination.

A new want is beginning to be felt in the prairie regions o the West. Every year scores of the houses which multiply so rapidly there are swept away by tornadoes; and as earthquakes to a degree dictate the forms of architecture in California, the wind is likely to influence the construction of buildings in the Mississippi Valley very materially. The ordinary balloon framing so much employed there is manifestly unfit to withstand the force of tempests; masonry, *pisé*, or concrete would be infinitely better, and would offer quite as many advantages in point of comfort and durability as the wood construction. The frame buildings would be cheaper than masonry in most localities, no doubt, and throughout vast districts even sand and gravel for concrete would be costly; but in these alluvial regions the use of *pisé*, for which any kind of loam is suitable, and which needs no lime except in the final plastering, might form an admirable resource. Such walls, with a roofing filled in perhaps with a similar material between the rafters, would form a habitation cool in summer, warm in winter, picturesque, and proof against anything but the most furious storms. We have heard that it is becoming customary for the inhabitants of those regions to provide cellars under some of the houses, and that in case of a thunder-storm the neighbors betake themselves to these cellars, so that they may be safe, even if they should find their houses missing when they emerged. This is a way of living with which Americans will not long be satisfied.

We have to acknowledge with thanks the receipt of the report of the New York Society of Decorative Art. Considering the character of its membership and their occupations, it is gratifying, as well as a little surprising, to note the business-like energy with which the operations of the society have been carried on, and we trust its success may be commensurate with its efforts. Among other things, a lending library has been formed, from which books are sent to all parts of the country. This affords not only a means of interesting and instructing persons and communities very widely scattered, but of ascertaining the condition and wants, so to speak, of the decorative art market, and we are glad to see that the demand in regions lying distant from the great cities is mostly for suggestions in regard to the adornment of houses by color, drapery, and similar decoration, rather than for designs for painted tiles or show embroidery. This is a sign of a healthy condition of public taste, and the New York Society, with other similar ones, will much promote its own interests by endeavoring to meet this demand, which if properly cultivated is likely to grow to large proportions. So far as our not very extensive experience of such societies goes, the limits of the field which decorative art might occupy in every-day life have by no means yet been reached. Embroidery, for instance, which appears from the report before us to be confined, in the goods offered for sale, to mantel and other lambrequins, curtains and screens, might be applied to furniture of all kinds, with great advantage to art, and, we should think, with profit to the designers.

The Cincinnati *Commercial* has published lately some articles, illustrated in as good style, perhaps, as can be expected from a daily paper, on certain remains attributed to the mound-builders, found near Wilmington, Ohio. The cuts are reproduced from some engraved for Dr. L. B. Welch, who has had them prepared for a forth-coming history of the antiquities of this nature which have been found in Clinton County, O., and probably do not give much more than a caricature of the illustrations of what must certainly be a very interesting book. As it is, the engravings indicate an artistic sense on the part of the designers of the objects, whoever they may have been, which we do not recollect to have been particularly struck with before in the mound-builders' works. Among other things is depicted an arrow, which, unless the engraver or draughtsman has improved upon the original, is profiled with great refinement, and decorated in a style which though common enough among barbarous nations to this day, shows a more civilized feeling than usual. The reproductions of the other illustrations are too rude for us even to guess at the style of the originals, but we notice among them a representation of a tablet, divided into squares, and filled with what would seem to be the characters of some written language. One of the characters is repeated in a larger size by itself, outside of the tablet. A few of the letters have a rather Chinese appearance, which may be interesting in view of the reported discovery of a stone in Central America with an inscription in the Chinese language, though in letters of a very archaic type.

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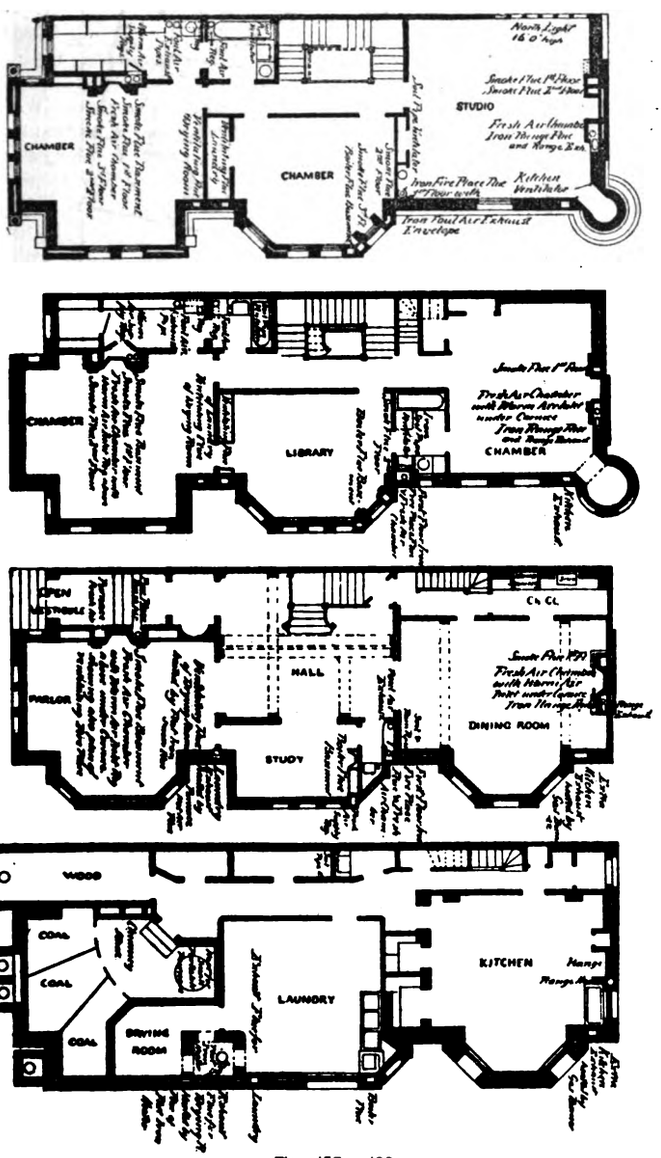
THE VENTILATING FIRE-PLACE.[1]—I.

FIG. 179 gives a plan of the parlor floor of the writer's house now being built in Boston after his drawings and specifications. Fig. 181 represents a portion of the fireplace-side of the front parlor, a room about seven meters square and four meters high, large enough to seat twenty-five guests comfortably. In it there are ten gas-burners. These were unwillingly left unventilated because of associations attaching to the chandeliers long used by the family. Provision has therefore been made for changing the air on special occasions at the rate of sixty-five cubic meters per minute through exhaust openings placed both at the ceiling and at the floor. The use of the unventilated gas-burners is a serious blemish in the system of ventilation employed. But as this unfortunately is a condition at present usually encountered by the sanitarian, who would find few persons willing to alter their fixtures for the sake of pure air, it is important to know the best way to meet it.



Figs. 177,—180.

The plan of the fire-place in this room is shown in Fig. 182. The back is constructed of a slab of soapstone, faced on the room side with ornamental unglazed tiles. The sides are built of fire-brick, faced with glazed tiles which reflect the light and heat of the flames and add to the effect of the fire. Behind the back and sides of the fire-place is a fresh-air space into which pure air is admitted directly from the outside through a register opening from the open vestibule as shown in Figs. 178 and 183, the latter being the front elevation of the house. The register is placed a meter up from the floor of the vestibule which is tiled up to the ceiling and open to the outer air, the front door being further in. The purity of the fresh air at all times is thus ensured. Its supply is regulated by a simple valve near the register, operated from the parlor by a cord at the right-hand side of the chimney-breast. The valve is nothing more than a plate of ¼-inch iron, which is lifted when the cord is pulled from within and opens the register, closing it again wholly or partially when the cord is released.

The fresh air is first moderately warmed by coming in contact with the heated back and sides of the fire-place, and then rises into a large fresh-air chamber above the mantel and behind the chimney-breast, represented in section in Figs. 184 and 185. Here it strikes the hot walls of an enlargement of the smoke-flue, similar in purpose to that described by Peclet (Fig. 125), though different in size, form, and principle of construction. After having been further warmed by contact with this furnace-attachment or heat-distributor in the smoke-flue, it enters the room through an ornamental cut-brass register in the chimney-breast, near the ceiling (Fig. 181), or it may be allowed to pass into the second-story room above, through a valve in the ceiling of the fresh-air chamber, shown at the top of Fig. 184, operated by a cord and tassel at the left-hand side of the chimney-breast. The furnace or distributor is in this case made of carefully

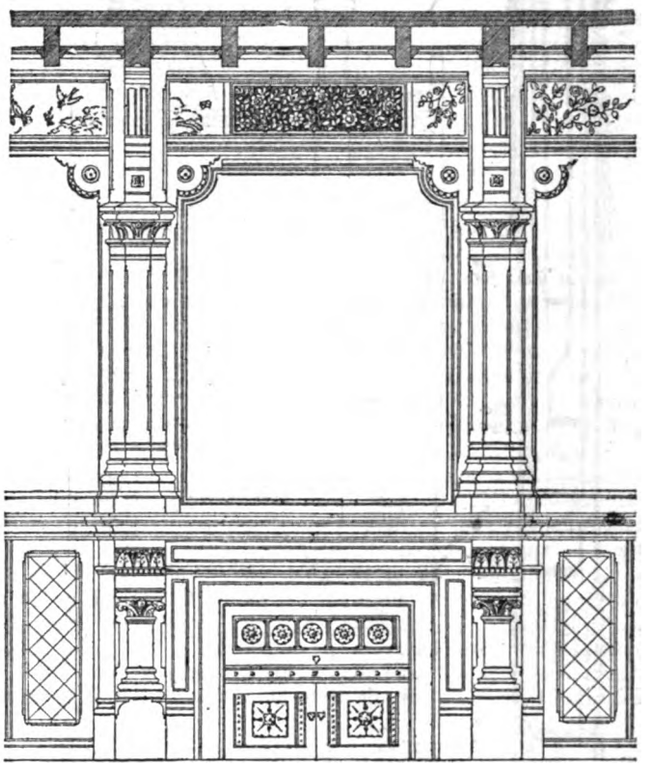


Fig. 181.

baked terra-cotta, especially prepared with a view to resisting the strongest heat and the most sudden changes of temperature without cracking. As a test, before making one of these radiators, the writer had a piece of terra-cotta, of the kind to be used, heated to different degrees of heat, including red-heat. Cold water dashed upon the sample raised to these temperatures produced no apparent injurious effect. On the other hand, if the clay is not of the proper kind and properly baked, a strong flame may quickly crack it when it is surrounded with cold air. Fig. 186 gives this distributor in perspective, somewhat modified in form, to show another way of arranging the dampers. The name "distributor" is given it, in preference to "radiator," as expressing more accurately its office: the heat is not obtained from it by radiation, except in a slight degree, but by convection, and "convector" would therefore be a more appropriate term. But any hot flue would in this sense be a heat "convector" as well as this. Its most characteristic function is to break up and spread out the current of smoke, and *distribute* its heat over a large surface, that it may be more readily taken up by the fresh air brought in contact therewith.

The movement of the smoke and of the fresh air are clearly represented in the sections by arrows. By referring to Fig. 144 of the soapstone furnace, it will be seen that the general principle of circulation is somewhat similar in the two devices. The column of smoke is subdivided and brought efficiently in contact with a large heating-

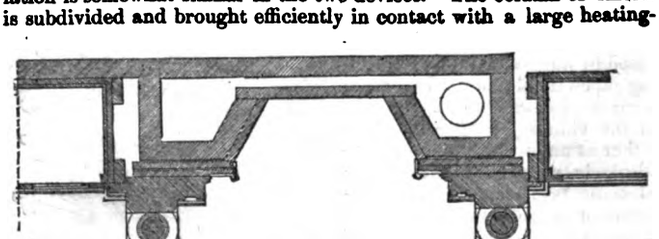


Fig. 182.

surface, without encountering sufficient resistance dangerously to obstruct its passage. The fresh air strikes almost every part of the heating-surface, without in its turn encountering serious resistance. By referring again to the Chilson furnace (Fig. 134), we see how the smoke is distributed equally among the six upright flues by a contraction of these flues at the top. To avoid the danger of clogging with soot, as well as the loss of heating-surface that would be involved

[1] This paper, by the writer of the Open Fire-Place articles, will be incorporated with them in their separate form.

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by a diminution of the flues, the principle of an *interior*, instead of an exterior cone, in the form of a movable cone-shaped damper, has been adopted, so placed in each flue that, while it diminishes the opening, it leaves the heating-surface undiminished. By this means, on the one hand, clogging is avoided, and cleaning facilitated, and on the other a greater heating-surface is presented to the rising fresh

Fig. 183.

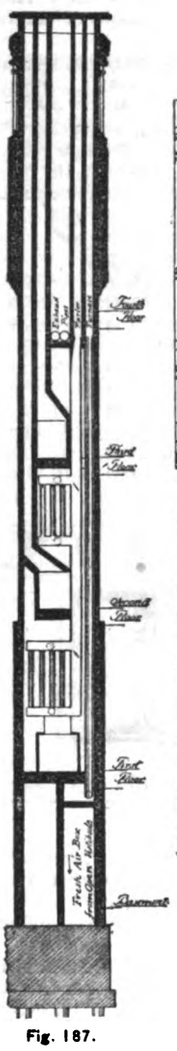

Fig. 187.

air, at less cost and in a more effective manner. The retreating surfaces of the cone, which appear rather to shun than to court the contact of the air, are avoided. Parallel surfaces are substituted, and there may be perpendicular, or they may be placed at an inclination, as in Fig. 184, and so arranged diagonally over each other (as in Fig. 185) that the fresh air is forced to embrace every part. To ascertain if this contact took place *actually*, and not merely theoretically, an opening in the fresh-air chamber enclosing the heater was made in such a manner that the movement of the current of air could be seen by the aid of a little smoke mixed with it. The air was found to circulate about the pipes exactly as expected, and as indicated by the arrows. The connecting pipes should never be placed horizontally unless the draught in the chimney is powerful, but either at an inclination or perpendicularly, as in Fig. 187, because in these positions very little obstruction is offered to the passage of the smoke. *The dampers should always be placed as far from the throat of the fire-place as possible*, in order to give the smoke opportunity to rise as far as possible and fill the pipes before meeting with the least obstruction.

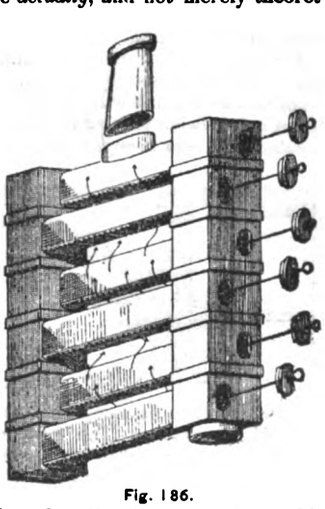

Fig. 186.

If these precautions be observed, such a distributor may be used in the same flue at each story of a building of any number of stories, without destroying the draught, for the slight obstruction occasioned by each distributor is more than offset by the improvement of the

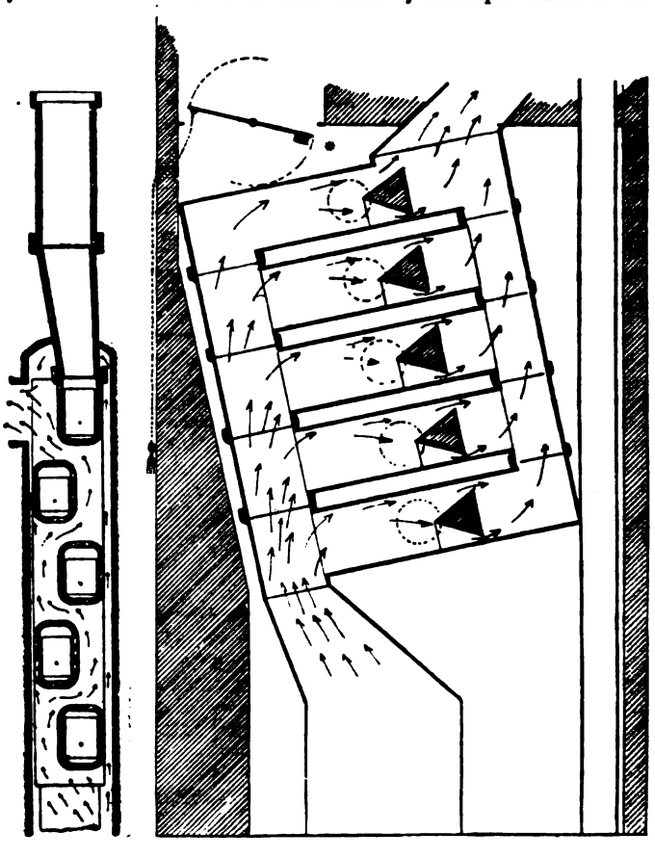

Fig. 185. Fig. 184.

draught made by each additional story added in the height of the chimney.

OLYMPIA.[1] — II.

This third volume will probably prove to be the most favored of all the annual reports of the excavations at Olympia, as it includes the magnificent Hermes of Praxiteles. It alone is sufficient to repay in scientific interest the entire labor and expense of the expedition. The statue, of which important fragments have but a few days ago come to light, is the subject of a monograph by Dr. Treu, printed as an appendix to the second volume.[2] There are many other remains of sculpture, especially of the Roman period, from the Exedra of Herodes Atticus. The latter fall far behind their Greek predecessors in artistic work, but are still valuable and interesting. Fragments of terra-cotta often preserve the colors painted upon them with great distinctness. Besides the representations of the sculptural and architectural discoveries the volume contains five heliotypes from photographs of the site of the excavations, and a topographical map which well displays the advance of the work. The first two of the former show the Heraion from the southeast. The spots where prominent remains were found or are known to have existed are marked upon the views by the figures of persons, — among whom a lady is conspicuous upon the bathron of the principal statue. The mighty stereobate of the temple with its low cella wall and the stumps of columns which escaped overthrow are plainly seen. The second photograph includes the pedestal upon which the Hermes of Praxiteles originally stood; the statue was found within the naos. The first gives in the foreground the well-preserved monolith of a circular fountain-basin, once before the front stylobate of the Heraion, upon a brick foundation with marble coping; further back is the crepidoma of the Philippeion, the relation of which to the hill and neighboring buildings is thereby evident. Upon the hill behind stands the German mansion of the superintendent of the excavations; to the left of it the chapel and some of the low houses of the village Druva. The third photograph shows the Philippeion and the Heraion from the southwest, beyond is the Exedra of Herodes Atticus, and in the extreme background the terrace upon which stood the treasure-houses. The fourth is of the square court in the eastern corner of the Gymnasion peribolos, an especially interesting view, as it makes clear many details of the pavement and chambers which would not otherwise be readily understood. The fifth includes the Exedra of Herodes Atticus, the western end of the treasure-house terrace, and in the foreground the northwestern corner of the Metröon stereobate, with its three steps and one remaining column.

[1] Die Ausgrabungen zu Olympia. III. Uebersicht der Arbeiten und Funde vom Winter und Fruehjahr, 1877-1878. XXXVIII Tafeln, herausgegeben von E. Curtius, F. Adler und G. Treu. Berlin: Verlag von Ernst Wasmuth, 1879.

[2] Hermes mit dem Dionysosknaben, ein Originalwerk des Praxiteles, gefunden im Heraion zu Olympia. Herausgegeben von Georg Treu. Berlin: Ernst Wasmuth, 1878.

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If the Exedra arc had here not been marked by a figure, it would have been difficult to recognize its extent, uncertain as this was rendered by the Corinthian pilasters of the rear, which remain in foundations beside the low brick walls. The topographical plan, representing the land after the third season, is on the same scale (1:1000) as that given in the second volume, and allows a good comparison. The increased surface which has been examined rendered a double plate (29–30) necessary. It is founded upon a trigonometrical survey of the Olympian plain which was commenced towards the end of the third season, the plan in the second volume still being dependent upon Allason's map in Stanhope's work, The Ruins of the City of Elis. The new survey has caused the change of several of the distances between Mount Cronion and the rivers: the relative position of the temples of Zeus and Hera and the Exedra, having before been founded upon measurements, is not altered. The comparison with the previous map shows what advance has been made,—especially great in the northern part of the Altis, — and what truly immense masses of earth have been removed. It is perhaps wise, as avoiding confusion, that the walls of the extensive Byzantine fortifications which stood upon the southern and southeastern part of the Altis are entirely omitted, but it would have been interesting to observe the relations in which these constructions were placed to the principal buildings of antiquity, and to understand to what extent the Olympian plain continued to be built upon at that late period. The Christian ruins might perhaps have been printed in a light color upon the topographical plate without interfering with the ancient temples and treasure-houses, the plans of which are given in solid black. In the western wall of the Altis enclosure, southwest of the temple of Zeus, there is a gate, called upon the plan the western portal, which has proved, after the removal of late Roman or Byzantine brick aqueduct arches from above it, to be a Greek structure. The position of the eastern enclosure at first appeared fixed by the discovery in two places of parallel walls which exist about where it was presumed to be. The identity is, however, not at all certain, as the foundations may have belonged to some building — perhaps to the Stoa of Echo, which Pausanias mentioned as in this vicinity. The Stoa itself may possibly have bordered the Altis. Of the southern wall nothing whatever is given in the publication, and thus the exact extent of the sacred enclosure cannot be determined. Further researches beyond its limits were made in the fourth season, the attention of the excavators then being first directed to the Stadion. At the time of the third report this was supposed to run nearly parallel to the eastern enclosure, between the foot of Mount Cronion and the Roman octagon, or the edge of the former bed of the Alpheios. The later researches show the direction of the Stadion to have been, on the contrary, from west to east. As the land to the north of it is too hilly for the arrangement of an extended level enclosure for races, it is reasonably concluded that the Hippodrome, which Pausanias speaks of at the side of the Altis, must be looked for at the south of the Stadion, near the octagon. Perhaps part of its extent has been cut away by the rushing waters of the river. Corresponding with these places for the public games and races, there are two large enclosures for the exercise and schooling of athletes, situated at the other side of the Altis. The smaller of the two has been discovered and its position and dimensions ascertained. The second, which must have been of very considerable extent, as it contained a preparatory Stadion, is supposed to be farther north in the valley of the Cladeos. Two of the brick ruins here which are published by Stanhope and Blouet [1] apparently belong to this Gymnasion. One of these structures, standing upon the western slope of Mount Cronion, and now used as a museum by the excavators, possessed arrangements for bathing which make it probable that its destination was in some way connected with this exercising ground. The land between the river and the hill, north of the smaller Gymnasion and the Heraion, is amply broad, — from two hundred to two hundred and fifty metres, — and gives place for the largest practising ground. The topography of the Olympian plain is, in its main points, now certain. This allows, for the first time, an understanding of the many references by ancient authors to the position of the buildings in the Altis, especially in the forty-two chapters of Pausanias bearing upon Olympia,[2] and in the delightful writings of Lucian, which have thereby gained a new importance.

A comparatively large part of this third volume is devoted to architecture. Much is published in it that was the more or less certain result of the excavations of the two former years. The eight folio architectural plates include plans upon a generous and uniform scale (1:150) of the great temple of Zeus, the Heraion, the Philippeion, the Byzantine church with its antique sub-structure, the Exedra of Herodes Atticus, and the western portal of the Altis enclosure. Beside these there are details of the first three buildings, and of the little circular edifices upon either side of the Exedra, as well as a comparison of three Doric entablatures, one of which is of the Metroön. The main results directly concerning ancient architecture which are to be awaited from the excavations at Olympia seem here embodied. There have been discovered three Doric peripteral temples, thirteen treasure-houses, the great brick Exedra of Herodes Atticus, and two gates of the western wall of the Altis. Outside the enclosure there is the Stadion, the Byzantine church supposed to have been built upon the Ergasterion of Phidias, the smaller Gymnasion and brick buildings of uncertain designation upon the banks of the Alpheios and Cladeos; the Roman octagon to the east, and a structure which seems to have served as a bath, to the west. Other architectural gains, not included in the third volume, are mentioned by short official reports and telegrams in various German periodicals. The principal of these appear to be the Buleuterion at the south, the Prytaneion, with the banqueting-hall of the victors, at the northwest, the pentagonal enclosure of the Pelopion, between the temple of Zeus and the Heraion, a triumphal gate at the southeast, and the foundations of two grand colonnades east and south of the Byzantine church. From the present lack of illustrations and descriptions of these latter discoveries it must suffice to merely mention their existence. Nor is it possible, before the results of the entire expedition are made public, to discuss the most interesting arrangement and composition of the architectural masses in their completeness, of the places and passages allowed the thousands of visitors to this great festal centre of the Greek world. Though all the remains that are found are in a state of the most entire ruin, the architectural results of the excavations have surpassed, in extent at least, the most sanguine expectations. When the Germans began work in 1875, the position of four buildings was known; now they have examined the remains of more than forty. With the exception of funeral monuments and fortifications — not to be expected from the Olympian plain, which was never inhabited as a town — almost all kinds of antique structures which are known are here represented: temples, entrance-portals, colonnades, monuments for display of various description. And to these are added many of which we have hitherto had no examples, — such as the treasure-houses, the Greek Gymnasion, the Exedra and waterworks, the Pelopion, Buleuterion, Prytaneion, and others less certain, as the work-shop of Phidias and the Leonidaion. The most important structure is naturally the great Temple of Zeus, the plan of which at Fig. 1 is adopted with addition of the staircases from Plate 31 of the publication.

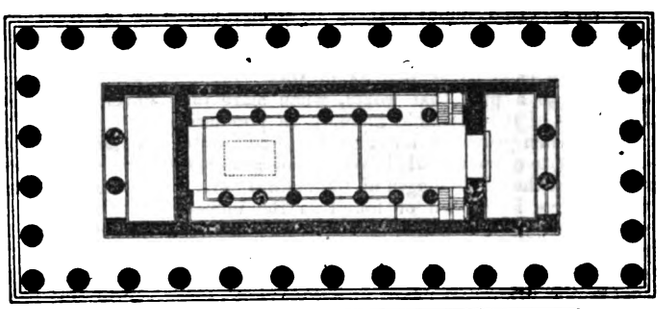

Fig. I. Plan of the Temple of Zeus.

The arrangement of the plan, to the smallest details of balustrades, is more certain than that of any other temple known. It is a peripteros of six by thirteen columns, the cella divided into the usual pronaos, naos and epinaos. The former, with two columns *in antis*, was closed by a *grille*, provided with three doors, one in each opening; the latter seems not to have been at all thus separated from the pteroma. The columns within the naos supported a gallery over the side-aisles to which the staircases near the door gave access. The position of these wooden ascents is marked by stone foundations, heaps of ashes showing them to have been destroyed by fire. The central aisle rose directly to the horizontal ceiling, which rested upon the entablature of the upper hyperoön columns. There were seven shafts in each flight, in all twenty-eight interior columns. The pavement of the naos was two steps above the upper stylobate without, a height of .39 m.; the side-aisles were a step higher still. .27 m. above the interior floor. The nature of the naos pavement cannot be determined, so thoroughly have its blocks, prized as a raw material, been dragged off for other buildings. All that remains is its foundation, the upper layer of the stereobate: at the western end, under the bathron of the great chryselephantine statue, this consists of carefully clamped and dowelled blocks of poros, about one metre square and .30 thick. Between the third columns from the back wall of the naos there lies a transverse threshold which, with the balustrade, or *grille*, doubtless upon it, bordered the standpoint of the sacred image. The under floor to the east of this, a square just in the middle of the naos, is differently constructed. The course is formed of long slabs of hard white limestone which alternate with broader blocks of poros. This second division was also closed from direct communication on the line between the third columns from the entrance door. The lengths of the central aisle of the naos was thus divided into three distinct parts. In that furthest back there stood the statue of the divinity; in the second there were probably tables for offerings, stiles, and other sacred belongings; here the prizes were presented to the victors in the Olympic games; the open third near the door remained as a passage and standing-place for the witnesses. The side aisles were also of free circuit, being separated from the standpoint of the statue and from the second enclosure by a balustrade running between the columns. The side aisles could be entirely closed by low portals between the second columns from the east and the walls. As it was desirable to walk around the statue, to view it from behind the balustrade, the "fence built like a wall," which kept Pausanias from going under the throne, was continued across the cen-

[1] Expédition Scientifique de Morée, ordonnée par le Gouvernement Français. Par Abel Blouet. Premier volume. Paris: Didot frères. 1831. Pl. 60.
[2] Paus. V. 7 to 27 inclusive, and VI. 1 to 21 inclusive.

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tral aisle. The existence of this transverse passage next the back wall, so important in the development of the Doric temple plan, is unquestionably evident from traces which remain upon the single floor block still in position. A more complete refutation of the separate *ædicula*, necessarily assumed to protect the chryselephantine statue from the weathering effects of an hypæthron supposed to exist in the naos, could not be desired. This fact has been fully recognized in the publication. But it is inconceivable how Prof. Adler, who wrote the introduction to the architectural part of the volume, can continue to refer to an *ædicula* in the Parthenon[1] (a similar fiction of his colleague Boetticher[2]), which originated from the same considerations of upper light. A discussion of the relation of the plans of the Olympian temple and of the Parthenon, including as it does some of the most interesting points of Hellenic architecture, would be too great a digression from the subject of the present notice. It is the writer's intention to return to the question upon another occasion. J. T. C.

THE DRAINAGE OF TOWNS.[3] — II.

Previous to developing a scheme for sewerage for a new locality, a careful study of its local topography is absolutely essential. For this purpose a map should be prepared on a scale not less than two hundred feet to an inch, or one to twenty-five hundred, on which the elevations of the streets above datum may be noted in figures at their intersections and at such points as define a change of inclination. Also levels of the water-courses where crossing the streets, and the high-water levels of the streams. Contour lines for every five feet of elevation should be drawn from actual survey over the whole district, and the area and character of the water-shed of any small streams that are to be provided for should be definitely ascertained. The rain-fall should be studied by consulting the observations at the nearest stations where such a record has been kept for a term of years, and a decision arrived at as to what portion, if any, of such rain-fall it is best to take into the sewers. We must also consider the present and prospective population of the place during such period as it is thought best to provide for, with a view to having the works conform in capacity as well as in their general scheme, as far as executed, to a plan that would, when more fully developed, meet the wants of the probable increase in population.

Even when providing for sewage and rain-water together, it is not customary to carry the whole volume of rain-water of violent storms throughout the whole length of the main sewers. When any natural water-course is crossed or found in the immediate vicinity of the main sewers, the overflow of the sewer into such water-course is generally provided for. It is readily seen that when a sewer is gorged with rain-water, flowing with a volume ten times as great as that of the dry-weather flow or *sewage* alone, the whole of this sewage is so far diluted that its discharge into the water-course is not likely to be of any inconvenience or harm in a sanitary point of view, for the stream into which such discharge takes place, would, even if small before, be now swollen by the freshet, and carry along all such occasional impurities with the mud and silt that are always taken into streams at such times. If the sewer had before the rain become slightly foul for want of flushing during a period of drought, the first effect of the accession of storm-water would be to rinse out the sewer, while the freshet is rising, so that the whole length would be likely to be tolerably clear of previous accumulations, some time before the point of overflow is reached.

The quantity of storm-water that is to be provided for is a question to be determined in each separate street for itself. The quantity in the main sewers will depend upon, first, the amount brought in by the laterals or branches, and, second, on the opportunities afforded on the route for the overflow of the surplus.

Among the first questions to be entertained and decided in planning a system of sewers is that of the *ultimate disposition* of the sewage. This is a question upon which a great amount of money has been expended in carrying out the various schemes that have been from time to time devised for the utilization of sewage. The quantity of organic refuse thrown off in the sewers of a large town is so large that it cannot with impunity be absorbed and carried along by small streams without danger to the health of the population residing on their banks. Even the tidal estuary of the Thames was so polluted by the sewage of London a few years ago that the further discharge along the banks where the sewers debouched was abandoned, and enormous intercepting-sewers were built to carry it along down-stream to Barking, on the north or left bank, and Crossness on the right bank, some twelve miles below London Bridge. These intercepting-sewers are about eighty-five miles in length, and cost upwards of four millions sterling. Even after all this expenditure the sewage is not entirely gotten rid of, but is wafted up and down the estuary by every tide. Its lesser specific gravity causes it to float upon the sea-water brought in by the tide, and its manifest presence in some twenty miles of the lower Thames has given rise to a good deal of discussion during the past two years.

In a report by Capt. Culver to the Thames Conservancy Board, published in London (*Engineering*, for January, 1878), I find the following: "Capt. Culver finds that while we have to some extent relieved the river westward of Blackwall up to the bridges, in some of the lower reaches the Thames is worse than it was before the main-drainage scheme came into operation. Close to the two outfalls there is a large collection of offensive mud, arising from the deposit of sewage matter. This we can fully verify from the fact of having taken samples last August from the banks of the Thames, near Barking. The matter was about as thick as, and of the color of, moistened paste blacking, and the odor horribly offensive — far worse in fact than the worst specimen we ever saw at Hungerford bridge in 1855-7." Capt. Culver states further that the sewage which passes out of the outfalls at Barking and Crossness rolls up and down with each tidal flow within a reach of eight miles. The solid contents are deposited in all the bays and creeks where the water is still, and they fall to the bottom during the time of low water. On the return of the tide they are carried up with it, even so far as Charing Cross.

The above seems to indicate that tidal estuaries are not the best places in which to discharge sewage when in such large volumes as is the case at London, and points to either the further extension of these main sewers towards the sea at some future day, or the utilization of the sewage upon the land. A portion, though a small one, of the sewage delivered by the great main at Barking, being the sewage of about twenty thousand people, has for some years been used experimentally on a farm, where the crops are irrigated by the crude sewage, but the experiment has not proved to be a profitable one.

The value of sewage to the farmer has been for many years considered in theory as sufficient to warrant its collection for chemical treatment and evaporation of its water, retaining the solid parts for sale as manure. Thousands of dollars have been spent in England in futile efforts to devise a method of doing this with a profit. But every company that has undertaken it in England has failed, so far as the value of the residual products goes. Such processes are continued only because they may afford, in many cases, the cheapest method of getting rid of the sewage for the community, and regardless of the profit by sale of products. I find the following in the London *Engineering*, of January, 1878. After referring to the successive failure of various methods of precipitation, etc., the editor says: "Other chemical processes are being tried at Leeds, etc., but we have not heard of a single case in which so much success has been arrived at as to encourage any hope that chemistry will help us out of the sewage difficulty. It is evident that both this science and engineering have hitherto been baffled by the sewage question." This, of course, refers to the attempts at converting sewage to use as a manure with a margin for profit. There is no doubt about the necessity of disposing of it regardless of profit, the only question being how to do so with the least cost, and in a manner which will give good sanitary results.

A proper regard for the welfare of the population residing along the banks of any stream into which the bordering towns have always drained their surface-water has led to prohibitory legislation in England, enforced by the courts, where these same towns began by developing systems of sewerage, to pollute those streams to an appreciable degree. The result has been that many towns are treating their sewage chemically for the purpose of avoiding such pollution, even though the residuary products are not of sufficient value in the market to recoup the cost of the process. The various methods of chemical treatment have been described at some length in the Seventh Annual Report of the State Board of Health of Massachusetts. If they had been attended with more success as measures of public economy, it would perhaps be more worth while to describe them here in detail, but their whole history has been either experimental and disastrous to their promoters, or tolerated in other cases as the lesser evil of the two which were presented to the particular town which adopted them.

The most successful method, commercially considered, which has hitherto been tried for sewage utilization is that of applying it directly to the soil. Two methods are in use for this purpose. The first is by irrigation of a surface which had been previously prepared by underdrainage so as to grow a succession of crops of some commercial value, giving rise to the name of "sewage farms." As the value of the crop has generally been regarded as of some considerable importance, for sake of economy, the sewage can only be applied to this land at such times as are consistent with the conditions of the growing crop, and since there are many times when its application would be an injury, rather than a help to the crop, much inconvenience is met with unless an ample area is devoted to the farm. In many cases an acre is required for the sewage of every one hundred or two hundred of the population, so that in providing for large towns it is often difficult to find land enough for the purpose, which combines the necessary physical characteristics as to porosity, facilities for under-drainage, and cheapness. This has led to the economizing of the breadth of surface treated, by using certain crops of somewhat inferior value, which would endure a more frequent soaking of the soil, and the choice of very porous material where very deep and rapid drainage was feasible. Mr. J. Bailey Denton, of England, has found by applying to such land a discharge of sewage at comparatively short intervals, having several fields for successive treatment in rotation, that the pores of the soil are capable of oxidizing or burning up, as it were, a vast amount of organic matter, by means of the fresh volume of air that was made

[1] *Deutsche Bauzeitung*. 1879. No. 79.
[2] C. Boetticher. Ueber den Parthenon zu Athen und den Zeustempel zu Olympia, je nach Treck und Benutzung. Ertkam's *Zeitschrift für Bauwesen*. Berlin, 1852. An essay continued upon pp. 194 and 498, and in 1853, pp. 127 and 269.
[3] A lecture by Mr. Edward S. Philbrick, C. E., delivered before the students of the Massachusetts Institute of Technology.

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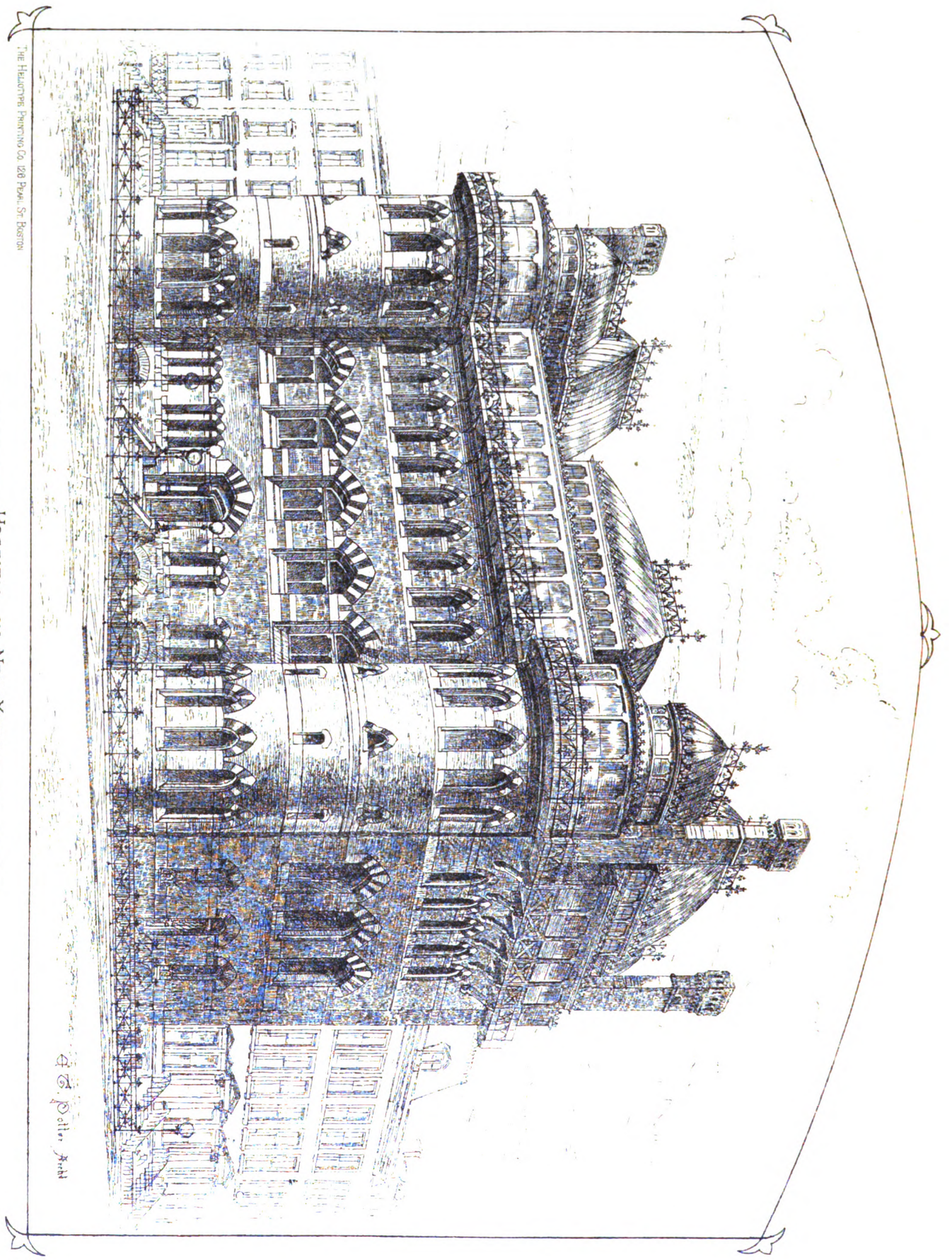

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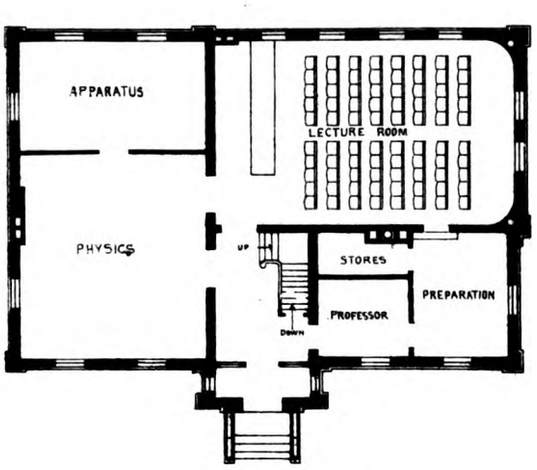
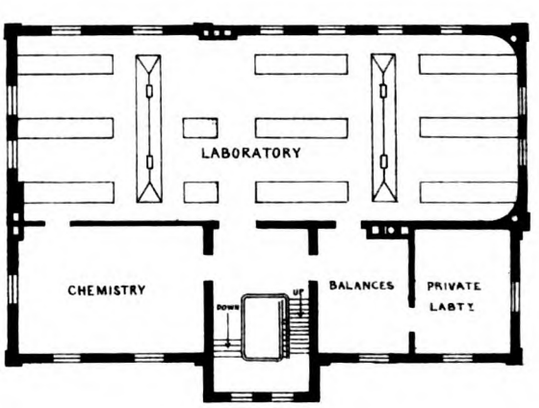
PERSPECTIVE SKETCH



GROUND FLOOR PLAN



SECOND FLOOR PLAN

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VASSAR COLLEGE POUGHKEEPSIE, N.Y.

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SHEET. 2.

SHEET. 1.

CREMATION FURNACE.

FRONT ELEVATION.

SIDE ELEVATION.

HORIZONTAL SECTION. X X.

LONGITUDINAL SECTION. X' X'.

TRANSVERSE SECTION. X' X'.

E.M. HOWARD, ARCH'L. WHEELING, W.VA. U.S.

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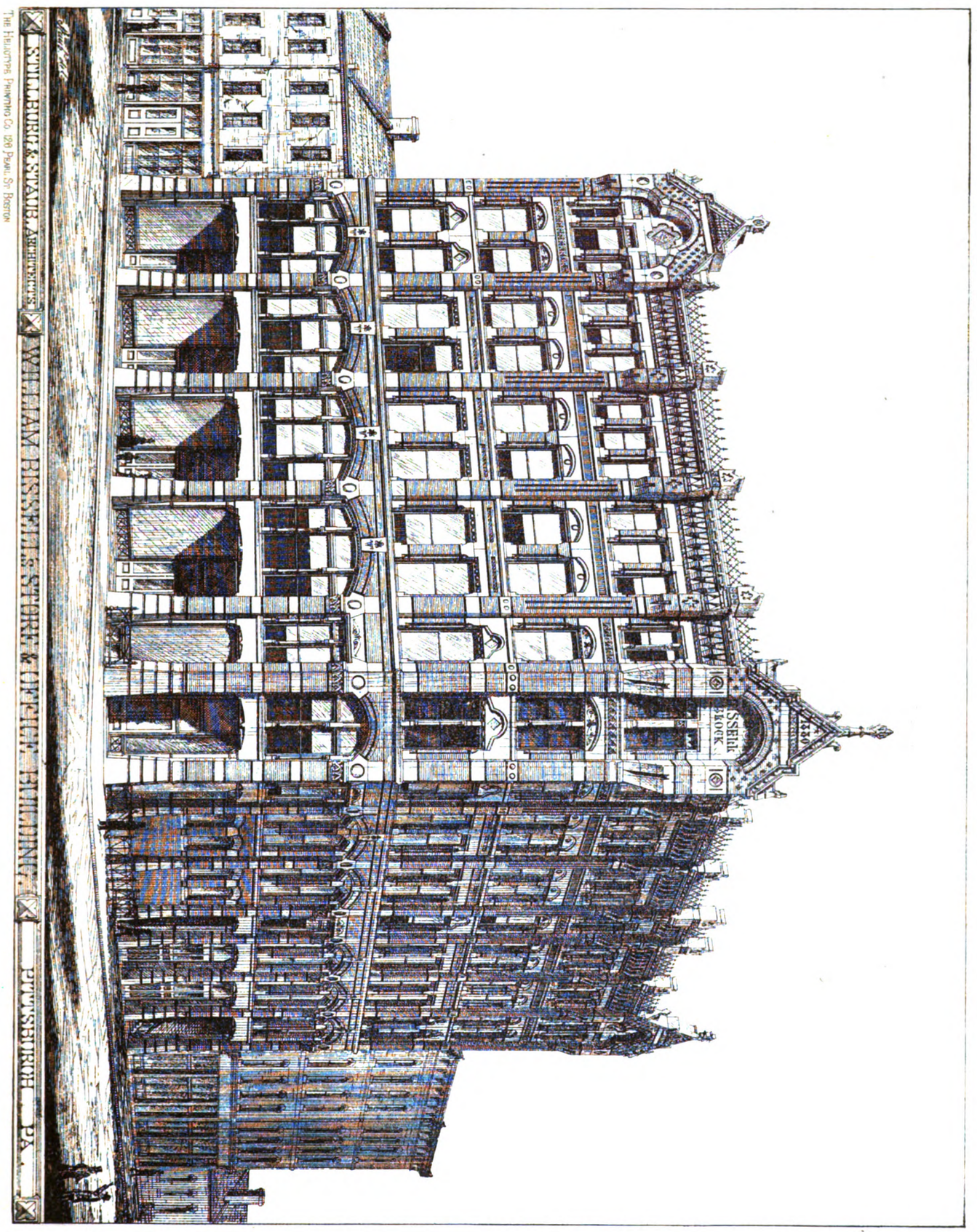
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to enter these pores from above, following the downward flow of the sewage as it percolates through the soil.

This is therefore called the method of "intermittent downward filtration." Mr. Denton tells us that an acre of good porous material can thus be made to absorb the sewage of at least one thousand persons, and yield at the same time from the under-drains a water that is sufficiently pure to be admitted to the natural streams without detriment. But if this method were to be applied to many large towns, it would require a considerable surface — nearly a square mile, for instance, to dispose of the sewage of Boston, even supposing we could find within a reasonable distance the proper quality of soil for the purpose. If the ordinary sewage-farm method be pursued, Boston would require some five or six square miles, or over three thousand acres, to absorb her sewage, even with the most porous soil, and some six or seven thousand acres with an average soil.

The feasibility of using sewage on the land is therefore a local question, depending on the topography of the surface, the character of the soil, and the market value of the land for other purposes.

In 1876, a committee was appointed by the Local Government Board of England to inquire into the several methods of treating farm-sewage. This committee arrived at the following conclusions:

"1. That the scavenging, sewering and cleansing of towns are necessary for comfort and health, and that in all cases these operations involve questions of how to remove the refuse of towns in the safest manner and at the least expense to the rate-payer.

"2. That the retention for any lengthened period of refuse and excreta in privy cess-pits, or in cesspools, or in stables, cow-sheds, slaughter-houses, or other places in the midst of towns, must be utterly condemned; and that none of the so-called dry-earth or pail systems, or improved privies, can be approved, other than as palliations for cess-pit middens, because the excreta is liable to be a nuisance during the period of its retention, and a cause of nuisance in its removal; and, moreover, when removed, leaves the crude sewage, unless otherwise dealt with by filtration through land, to pollute any water-course or river into which such sewage may flow. We have no desire to condemn the dry-earth or pail system for detached houses, or for public institutions in the country, or for villages, provided the system adopted is carefully carried out.

"3. That the sewering of towns and the draining of houses must be considered a prime necessity under all conditions and circumstances, so that the subsoil-water may be lowered in wet districts, and may be preserved from pollution, and that waste water may be removed from houses without delay, and that the surfaces and channels of streets, yards and courts may be preserved clean.

"4. That most rivers and streams are polluted by a discharge into them of crude sewage, which practice is highly objectionable.

"5. That so far as we have been able to ascertain, none of the existing modes of treating town sewage by deposition and by chemicals in tanks appear to effect much change beyond the separation of the solids and the clarification of the liquid. That the treatment of sewage in this manner, however, effects a considerable improvement, and when carried to its greatest perfection, may, in some places, be accepted.

"6. That so far as our examinations extend, none of the manufactured manures made by manipulating towns' refuse, with or without chemicals, pay the contingent costs of such modes of treatment; neither has any mode of dealing separately with excreta so as to defray the cost of collection and preparation by a sale of the manure been brought under our notice.

"7. That town sewage can best and most cheaply be disposed of and purified by the process of land irrigation for agricultural purposes, where local conditions are favorable to its application, but that the chemical value of sewage is greatly reduced to the farmer by the fact that it must be disposed of day by day throughout the entire year, and that its volume is generally greatest when it is of the least value to the land.

"8. That land irrigation is not practicable in all cases, and therefore other modes of dealing with sewage must be allowed.

"9. That towns situated on the sea-coast, or on tidal estuaries, may be allowed to turn sewage into the sea or estuary, below the line of low-water, provided no nuisance is caused; and that such mode of getting rid of sewage may be allowed and justified on the score of economy."

Signed by ROBERT RAWLINSON,
CLARE SEWELL READ.

It appears, then, that sewage can best be disposed of, according to circumstances, in one of the following modes: —

1. By discharging it into the sea or other bodies of water large enough to dilute it to such an extent that it will not be likely to again become a nuisance.

2. Where the conditions do not admit of the above, and where porous soil, capable of underdrainage, can be found convenient, to apply the sewage directly to the soil by irrigation, to be absorbed by the crops.

3. Where land is more limited in extent, and the soil still porous, the process of intermittent downward filtration is a safe method, though not so likely to give crops of any value on the land as the second method.

4. Where neither of the above methods is available, the sewage may be treated by chemicals, precipitating the solids in suspension, and so far modifying the impurities in solution as to render them harmless when discharged into small rivers and streams.

Past experience does not, however, justify us in expecting any profit to accrue to the town from any of these processes of disposal.

We have thus seen that before maturing the plans for sewers for any district, we must have the following points well studied, and the facts presented in a clear form: —

1. The topography of the surface. 2. The average and the extreme rain-fall. 3. The physical characteristics of the soil, and the character of the surface; whether more or less steep, and more or less covered with buildings and pavements, which would favor a rapid surface-drainage. 4. The denseness of the population and its future prospects of growth. 5. The disposal of the rain-fall, and how much shall be taken into the sewers, if any. 6. The ultimate disposal of the sewage itself.

THE ILLUSTRATIONS.

VASSAR BROTHERS' LABORATORY, VASSAR COLLEGE, POUGHKEEPSIE, N. Y. MESSRS. SILLIMAN & FARNSWORTH, ARCHITECTS, NEW YORK, N. Y.

THIS building was built for Mr. Matthew Vassar, Jr., and Mr. John Guy Vassar, who presented it upon completion to Vassar College for the use of the department of chemistry and physic. The walls are faced with Poughkeepsie sand-brick laid in red mortar and relieved with terra-cotta, black brick and North River bluestone. The interior is finished in white pine stained and finished in bees-wax. Accommodations for eighty pupils are furnished in the lecture-room on the ground-floor and also in the laboratory on the second floor. The system of heating is by direct radiation. The ventilation is arranged with considerable care, and flues are provided for the pure and foul air in every room.

STORE AND OFFICE-BUILDING, PITTSBURGH, PA. MESSRS. STILLBURG & STAUB, ARCHITECTS, PITTSBURGH, PA.

This store, which is now building, measures ninety by one hundred and twenty feet, and is built of Philadelphia brick, decorated with shaped brick furnished by the Peerless Brick Co., and with Ohio stone. Stores occupy the lower floor, wholesale rooms the next, and offices the remaining floors.

CREMATION FURNACE. MR. S. M. HOWARD, ARCHITECT, WHEELING, W. VA.

For a full description see the article in another part of the paper.

A HOSPITAL IN NEW YORK. MR. E. T. POTTER, ARCHITECT, NEWPORT, R. I.

This hospital, which was built some years ago, is intended for crippled children, with a winter-garden on the roof, and in the rear a fire-proof tower, containing fire-proof stairs and a large lift, with access from both to the garden and to the wards on every story. The wards have windows on four sides. The baths, closets, and attendants' rooms are in the projections at the angles. These are rounded so as to cast less shadow, the intention being to use the building somewhat as a sun-cure. For this reason also, the windows are made large and the tower with lift and stairs are placed on the north side. The well of the stairs, enclosed with a brick wall, together with the outside wall of the tower, also of brick, supports the steps and landings. The windows in the tower follow the rake of the stairs. The door-ways are low and have iron doors, to shut out fire in any ward from the stairs. The doors, stairs, and lift are wide to admit of the passage of patients on stretchers. The court-yards are open to the street. Doors at the foot of the stairs open on the courts. While the costly and difficult task of making a building of many stories fire-proof was not attempted, the safe escape for the slow moving and helpless was sought by effective but comparatively inexpensive means; but the most careful planning may be made useless by a single thoughtless act. Subsequent to the completion of the building the resident physician had the brick shaft containing the lift lined with vertical floor-plank "as more pleasing to the eye than a brick wall." The building faces south; the south and east fronts are those shown in the view. The furnace and engine-rooms, etc., are under the court-yards, lighted with sky-lights, and are fire-proof. There are four or more large fireplaces in every ward, as aids to ventilation, to which end the domes of the winter-garden also assist. In warm weather the garden can be thrown open on all sides.

CORRESPONDENCE.

THE PICTURE GALLERIES.

PARIS.

IT will perhaps surprise many who look on Paris as the great centre of art to hear that during the three winter months it offers no opportunity of seeing recent pictures; for those in the Luxembourg are generally well known before they are admitted. To be sure, the visitor to Paris may join the groups which are forever flattening their noses against the picture-dealers' windows, but there is rarely anything to be seen of interest there, and even a cursory visit within is not more satisfactory, for the principal dealers are in the habit of showing their best works only to their patrons or after a special request to see what they have by a certain painter or in a certain style. The dealers may be credited with knowing best their own business, but I believe many rich foreigners pass through the city without a fixed purpose, or with only vague intentions, of buying works of art, who would be easily tempted to do so had they more direct opportunities of seeing them. It is thus with impatience that the art-loving public here looks forward to the early spring exhibitions of the two chief artists' clubs. These clubs, though in a great measure composed of amateurs, include many of the best artists, some of whom belong to both. The "Cercle de l'Union Artistique," commonly called "Les Mirlitons," has more social prestige than the "Cercle Artistique et Littéraire," dubbed the "Crêmerie." There are two painters who in both exhibitions conspicuously challenge public attention and divide its sympathies. Carolus Duran and Bonnat are now the two representative portrait-painters of France, and so closely matched are their different qualities that each fresh work has a marked influence on their relative position before the public. Thus, had an accident prevented the appearance at last year's *Salon* of Carolus Duran's portrait of a lady in a fur mantle, Bonnat

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would have continued, during this year at least, undisturbed in the preëminence which his grand portrait of Thiers had given him the year before; but that portrait by Carolus Duran was so marvellous, so masterly in every way, that it carried all before it, and its author found himself suddenly within reach of the "*medaille d'honneur.*" I say suddenly, but not unexpectedly, for he long ago declared his only rivals to be the old masters; even in this magnificent vanity Bonnat is his rival, however, for the latter looks with equal and supreme disdain upon his contemporaries. It is not surprising, then, that while waiting to see what these remarkable men have sent to the *Salon*, the public should eagerly examine their minor works in the club galleries, and curiously note all evidences of a modification in style.

At the "Mirlitons" Carolus Duran exhibits the half-length portrait of a lady in white satin, which shows a continued development of the change of style by which he so remarkably escaped in his last year's portrait his former crude and often vulgar painting. In his earlier works everything was sacrificed to breadth of effect and frank simplicity in laying the colors; the planes and general values were strongly established, but there was no care to model them into each other. Now, in place of the chalky lights upon flat opaque flesh-tints, even the high lights are subtly modelled, and the half-tones melt with tender gradations into the transparent shadows. Having made himself a master of breadth of effect, the painter now disguises that simplicity by delicate modelling, and the result is to envelope the former "painty" surfaces in a luminous medium full of tender sentiment. It would be interesting to know how far these modifications in style are the results of a premeditated development of the painter's technical power, and how far due simply to the growth of his artistic intelligence. In the portrait before us the white satin of the lady's dress is rendered with a careless ease,— which could only come from close study of Velasquez at Madrid,— but so true is the effect that a model posed beside the canvas would, if viewed from across the hall, appear less real than the picture, unless indeed the lights upon her dress and face were arranged with the same art which gives such brilliant relief to the painting. A portrait of a child hangs just beyond, but will add little to the reputation Carolus Duran has already gained for seizing, as only so swift a hand as his can, the open-eyed gaze of children. His contributions to the other club are less important, being a portrait of his mother and a man's head. So far this painter's life has been one of strenuous effort to develop and perfect his powers. He has now obtained the highest honors, and nothing but the rarest artistic conscience can enable him to resist the temptation to be content with himself, which means a careless abuse of his skill and ultimate loss of power.

In the place of honor facing the lady's portrait by Carolus Duran, hangs Bonnat's chief contribution to the gallery of the Place Vendôme, which is a portrait group of two children. From a distance, their spirited pose and the brilliant effect of light upon their blond heads gives a certain distinction to the picture, which, however, further examination does not justify. One sees, to be sure, a master's hand, but the bloodless flesh-tints are crude and dirty, and the drawing careless; so that the picture is unworthy of the painter whose collection of masterly portraits was the finest at the Universal Exhibition two years ago. The unsatisfactory coloring of this picture is the more striking since Bonnat has had recourse to his favorite trick of relieving figures against a certain brown-madder background, which for years he has introduced into his pictures and portraits. Be it an Italian peasant, a lady in full toilette, or Jacob wrestling with the Angel, the copper kettle of the first case, the boudoir chair and angel's wings of the other examples, are enveloped in the same identical ruddy mist. Successful as such a *fond* may be in helping him to his brilliant reliefs of flesh-tones, the trick finally becomes wearisome, and signally indicates the man's poverty of imagination. On looking at the heads of two men which the same artist exhibits, one asks if the abnormal pallor of the above-mentioned children was not intended as a foil to set off the really great power with which Bonnat paints "beefy flesh." If the shade of Velasquez may be imagined proud of the works which Carolus Duran's study of him has produced, so the rival of Velasquez, Ribera, may be supposed to look down with content on the vigor with which Bonnat presents such an incarnation of blood and muscle as will only be caught from the Spanish master's work, for Bonnat, a native of Bayonne, was early within reach of the Madrid gallery. The two heads of which I speak are only sketches, and are not *empâté*, like his pictures. The gray *fond* of the canvas is almost, as in water-colors, modelled into a head, and dashed with high lights by a few — marvellously few — strokes of a small brush, yet the effect is almost revolting from its realistic fleshiness. Skill of technique has never been carried further, and these brilliant trifles but increase the eagerness with which the public are waiting to see what Bonnat has done in his portrait of M. Grévy and a "Job" to be exhibited at the *Salon*.

Meissonier exhibits only at the "Mirlitons," and his contributions are relatively, for him, insignificant. One, a traveller on horseback, lacks the breadth and precision which usually distinguish his minutely-finished pictures; but the other, a cavalier in a stairway, is more worthy of himself. In the same gallery, Gérome exhibits a small figure-study whose expression and attitude is defined with masterly precision. As an offset to the prestige which the smallest canvases of these two last-mentioned artists give to an exhibition, the "Cercle Artistique et Littéraire" offers a striking work — La Verité, by Baudry. Though small, this nude female figure, modelled in full diffused light, without shadows, is a *chef d' œuvre* very welcome to artists and amateurs. Baudry has exhibited but little of late, and his great works in the *foyer* of the Opera-House, seen through a haze of gas and smoke, are but ghosts to remind us of his power, which combines a robust idealism and *style* with a peculiar modern refinement, and is greatly needed to combat the brutal realism of the day. Let us hope he will soon have some other great decorative works to show the public. An interesting work in this same gallery is by Albert Maignan, a young man who is rapidly winning his way to the front as a painter of mediæval scenes and episodes. He has not yet risen into the higher atmosphere of historical painting, for thus far, — as in this, The Last Moments of Theodobert, — the picturesque has been the real motive of his work. There is much sentiment in his painting, and his rich and varied palette will go far to make up for the want of an early art-training. The most remarkable work by any of the younger men is Parlementaire aux Avant-postes, by Detaille, the military painter, which is a great advance upon his former clever but rather dry painting. Here he has enveloped his landscape in a deliciously misty atmosphere, through which bursts a gleam of sunshine, striking with fine effect upon the soldiers of the foreground.

Doré, if only to make room in an *atelier*, which, it may be suggested, is always too full, exhibits in each club, both as painter and sculptor. What restless demon urges this clever man to waste his power in sketches! His patience has never yet sufficed to develop his subject beyond the stage of suggestion, and this is never more apparent than in his gigantic compositions. Passing over some ingenious little statuettes, I must give him credit for one of his landscapes, as being really a fine — and, strange to say, not unnatural — twilight effect. After the works above mentioned these galleries contain little of interest, and, albeit most of the signatures are those of professional artists, the average is weak and amateurish; notably there is a lack of even fairly good landscapes, and no marines worthy of the name. The few casts and statuettes scattered about the rooms call for no special notice. R.

UNREST.[1] — I.

The subject which we may, I think, profitably discuss is the tendency observable in contemporary architecture to bestow too much care on the accessories and too little on the general design. It may be thought that in this respect our architecture naturally and perhaps inevitably reflects the temper of the age — its fever and fret, its strange mental excitement and all-pervading disquiet. It is nevertheless competent for us to modify, if not to alter, the course of our art by persistent and united effort in avoiding unwholesome excesses in any given direction, and by cultivating the opposite virtue.

My contention is, first, that in too much of the work of the present day an altogether disproportionate amount of attention is given to mere "details," using the word in the sense in which a painter uses the word "finish." Secondly, that our buildings are, as a consequence, characterized by a fussiness and disquiet destructive of the nobler qualities of architecture. Thirdly, that the redundant and obtrusive details are mostly, though of course not necessarily, of a very impure type. Fourthly, the detail, even when excellent in itself, does not appeal to the ordinary mind, which is, nevertheless, amenable to other influences within the compass of our art — that whilst the kind of beauty attainable in the minuter portions of a building and its decorations, though, no doubt, a very desirable quality, is equally at the service of the sculptor, the painter, and others, the power and impressiveness of a fine architectural composition, and the qualities which distinguish it as *creative* from merely *imitative* art, are attributes all its own. Fifthly, that by relinquishing or by not developing to its utmost limit our hold over this source of effect, we deny ourselves our distinctive means, as architects, of appealing to the imagination.

To take an illustration, the copious and admirable illustrations which from week to week appear in the various professional journals will, I submit, bear out my view as to the undue attention given to details of every kind, to the exclusion of weightier considerations. By the aid of the press we are enabled, without quitting our study chair, to pass in review the contemporary architecture of almost the whole English-speaking race, and we cannot but be struck by the strong family likeness, in minor points, between many of the buildings so illustrated. Special forms of detail apparently become occasionally epidemic. The preceding Royal Academy exhibition has perhaps given marked prominence to some design of exceptional merit, and it is in due course popularized by one or other of the professional journals. So soon as its distinguishing characteristics have had time to sink into the architectural mind and germinate, we get quite a crop of designs repeating, more or less exactly, the admired original, but with this peculiarity: the admirers of our supposed design fasten only upon its accidents, as I may call them, — queer excrescences of all sorts, funny little pediments and panels, dodgy chimney-stacks and caps, curious forms of windows and their glazing, of metal-work, barge-boards, balusters — attenuated or gouty as the mode may be — great sunflower finials, — "details," in short.

Designs from every corner of the kingdom are for a while troubled with these "thick-coming fancies," but with this lamentable result, that the *power* of the original which inspired all this emulation is *not*

[1] From a paper read at a meeting of the Architectural Association on April 23d by Mr. E. Ingress Bell.

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attained. It was great in other ways, and in spite of all these oddities; and the really excellent qualities in it were not apprehended or were not reproducible by less able hands. That its smaller characteristics only or mainly have been fastened upon for reproduction shows the present bent of our minds. Our sketch and note books, the records of our holiday trips, all testify to the fact that we are too prone to seize upon the odds and ends, the titbits, of the buildings that strike our fancy, and the resulting facility we acquire in employing such in our own work leads to an extravagant and irrational use of them, and imparts to it that character of unrest which I am deprecating.

A noticeable instance of the feeling I am referring to is provided by the recently published autobiography of the late Sir Gilbert Scott. When one of the great Government competitions was imminent, he, with characteristic energy, prepared himself at once for the conflict by sedulously collecting and arranging such items of his design as cornices, parapets, windows and their dressings, and all the minor elements of his composition. Now this is most instructive, as showing us the side upon which a distinguished architect attacked a problem of unusual magnitude. To some results of his method I shall refer later on. At present I only note the fact as an illustration of a principle of design which appears to me radically faulty. As a consequence of our modern method, few of even the most considerable modern buildings do much to help the attractiveness of our large towns. We are in this respect far behind the architects of the sixteenth and seventeenth centuries.

The beauty of most of our buildings, such as they possess, is mainly of a microscopic order, and has to be searched for in petty details. We have of late years witnessed the removal of buildings of no great antiquity, nor of any special architectural excellence, yet possessing a telling picturesqueness which appealed to and was appreciated by all — cupolas, lanterns, and similar features which diversified the sky-line of this wilderness of bricks and mortar. The sites of these old buildings have been covered with others conspicuously deficient in the qualities and attractions of the old. The energies of their builders appear to have been given to surface decorations in low relief — pilasters, panels, carving, strings, and the rest, ineffective under our cloudy skies, and all soon to be reduced by soot and dust to one grimy obscurity. The sky-line is simply a monotonous row of chimneys, and we may think ourselves lucky if they are not ravelled out into a ragged fringe of cowls and tallboys. The effect of the composition as a whole does not appear to have engaged a moment's thought. An example of a similar inability to grasp the whole of a problem is provided by the fashion which now obtains of painting the outsides of our London buildings in "art-colors," as somebody calls them, while the roofs and chimney-stacks are left unreformed and hideous. The public does not apparently feel the incongruity. In the face of such apathy it is not surprising that the *ensemble* of our public works receives less attention than it deserves, or that of many of the more prominent buildings of the metropolis we are constrained to say, as the immortal Mr. Mantalini said of the duchesses and dowagers whom he refused to marry, that "they have either positively no outline, or their outline is a dem'd outline."

The causes for this, as I submit, defective system of design are, I think, threefold, and for the first of them we must go back to the Gothic revival. It was discovered very early in the movement that, in order to secure a satisfactory resemblance to ancient work, accuracy of detail was of the first importance. Accordingly, for a time all the energy of the leaders of the revival was directed to a patient and unsparing investigation into the minutiæ of mediæval buildings. The result was a thorough knowledge of every item in their composition, its chronology and development. This knowledge was duly catalogued, illustrated, and recorded in such text-books as Parker's Glossary, Paley's Mouldings, and others with which you are well acquainted. We had all their varieties at our fingers' ends, and were ready in their application. But, having with infinite labor completed our analysis, it was found that a corresponding synthesis was a quite different matter. The training we had gone through and the knowledge we had gained, though useful, nay, indispensable to us as antiquarians and archæologists, proved rather a hindrance to us as artists, and we have found it as impossible to reproduce the spirit and excellence of the mediæval works from our scraps and details as it would be to reconstruct deal boards from sawdust.

As a second cause of our present manner, and connected with the Gothic movement, we may, I submit, adduce a certain purism which adopted and carried out too rigorously Pugin's celebrated dictum about ornamenting construction. We have been frightened by the utilitarian and his "obstinate questionings," and have tacitly admitted the propriety of his eternal query — What is its use? In endeavoring to find a sufficient *raison d'être* for every element of effect in our designs, we have been led one by one to abandon them almost all. It is curious to see how furtively (except in the case of a church) an architect introduces a tower into his designs. He does occasionally summon the courage to propose such a feature, and even domes have been built (upon paper). But such plights generally succumb before the old question, *cui bono?* The tower is sometimes allowed on the plea of a clock and eight bells. A clock is, however, notoriously difficult of treatment architecturally; and, moreover, in these days, when every one carries a watch, is not needed. The bells are rarely hung, and would be still more rarely rung. The last defence is that it is a place for records. A most weak reason, as it seems to me, for the thick walls leave but little interval floor-space, even in a large tower, and the piling up of records, tier upon tier, cannot be a safe or economical disposition of them. It is [not] to be supposed that a peal of bells was designed for each of the three towers of our cathedrals. The plain reason is, that for artistic purposes, towers, domes, cupolas, and the like are necessary. Like the lilies of the field, their use is beauty; but we have not had the courage to avow the fact, and to defend their introduction on artistic grounds. We have, consequently, in our despair, turned to surface decoration, and what Sir C. Wren called "Crinkum-crankum work," as the only field in which our ingenuity could expatiate. I come now to the third, and perhaps most potent, cause of the system which I have ventured to deprecate, — to the teaching and influence of a very remarkable man. There is no one who feels a more unfeigned admiration for Mr. Ruskin's genius than myself, and if I venture to controvert any of his dicta on matters pertaining to our art, it is with reluctance, and not, I hope, without a becoming diffidence. The fact that it is impossible nowadays to treat upon art in any of its manifestations without some reference, direct or implied, to Mr. Ruskin and his work, shows conclusively how largely the current of art-life has been influenced by him, and is in itself a tribute to his commanding ability. Still I cannot help feeling in the publication of his views upon architecture he unwittingly dealt a blow at architectural progress, from the effect of which we have not yet recovered. I need not explain at large to the present company the distinctive portions of his teaching to which I allude. Almost any view on the subject under consideration would, I am aware, find some countenance from isolated passages in his works. But about the general drift of his teaching there cannot, I think, be any room for doubt. He is, above all, the apostle of small things — "details," in short; and his views may, I submit, be not unfairly summarized in the following extract, in which he described his growth in art-knowledge, and his maturer convictions respecting the art of architecture: "The only admiration" (he says) "worth having attaches itself *wholly*" (the italics are his) "to the meaning of the sculpture and color on the building, very regardless of general form and size, but intensely observant of the statuary and floral mouldings, mosaics, and other decorations. Little by little it gradually became manifest to me that the sculpture and the painting were, in fact, *the all in all of the thing to be done* — that these which I had been long in the careless habit of thinking *subordinate* to the architecture, were, in fact, the *entire masters of the architecture*, and that the architect who was not a sculptor or a painter was nothing better than a frame-maker on a large scale." It is clear from this typical passage that the new departure which he inaugurated was an excursion in quest of newer varieties and greater excellence of detail, sculpture, floral mouldings, and the rest. He not only deprecates the ascription of any artistic merit to what we may call architecture proper, but he dubs it contemptuously, "frame-making on a large scale."

AN OIL-BURNING CREMATION FURNACE.

WHEELING, W. VA.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — In the fall of 1876, during the excitement preceding the incineration of Baron De Palm, in the cremation furnace of Dr. Le Moyne, situated in the town of Washington, Penn., thirty miles distant from here, I began a series of experiments with a view of demonstrating that a human body could be reduced to ashes in considerably less time, and in a simpler and less repulsive manner, than the time required by the Le Moyne furnace, and the mode of incineration there to be practised. The result of my experiments was published throughout this country and Europe, prior to the De Palm incineration, and caused many persons interested in the subject of cremation to write me for a detailed description of the furnace used, and in some cases to request permission to cremate their deceased friends.

As the subject is now becoming more popular every day, and crematories are projected in different cities, and as these communications are getting to be quite a task to answer, I now forward to you for publication the drawings made at that time, in order that those who design erecting a building of this class can see what progress I had made in the art of cremation.

The furnace used in experimenting was an ordinary "oil furnace," known to glass-makers as a "glory-hole," similar in shape and appearance to a bee-hive: it was about six feet in diameter. The oil used was a distillation of petroleum, known as "fuel oil" and in common use in glass-houses to heat the "warming-in furnaces." This was run into a metal dish, called a "shoe," under the combustion-chamber with a quarter-inch pipe, and there ignited. The bodies were put into rude clay retorts made specially for the work and placed on suitable supports in the body of the furnace.

The exact degree of heat we obtained, I am sorry to say could not be ascertained, since the construction of the furnace made it impracticable to note it; but at one time the furnace was so hot, that the metal bars used in adjusting the retorts melted down like lead, showing that we had a temperature approaching 2,900 Fahrenheit. Without entering upon the result of each successive trial, I will say that calculations based on these experiments established the conclusions that a body weighing one hundred and fifty pounds could be reduced in from one to two hours time, in a properly constructed furnace, or four hours from the time the fire was started.

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At the cremation of Baron De Palm in Dr. Le Moyne's furnace, it required thirty hours time to get the furnace sufficiently hot, consuming over forty bushels of coke; the body weighed ninety-three pounds, and was three hours in being reduced. It was without intestines or brains, as it had been embalmed some six months before, and of course was not as difficult to reduce, as one who had just died, even if of the same weight.

The accompanying drawings (see Illustrations) illustrate my ideas of a cremation furnace and crematory as deduced from the various experiments made at that time.

In Sheet 1, I have shown the furnace in detail. My idea was to give it a monumental or tomb-like appearance, and thus in a great measure rob it of one of its most repugnant features in that connection, — that of a fiery furnace; and with this end in view, I designed the furnace proper, which was to be built of fire-brick, to be encased with a covering of galvanized sheet-iron, which would admit of any contraction or expansion of the brickwork, and also could readily be removed for repairs, it being made in sections for that purpose. In Sheet 2 I show the furnace arranged at the intersection of the arms of a cruciform-shaped chapel, thus associating the process of cremation with the symbol of the Christian church.

In Sheet 1, the letter A designates the wall of the furnace, built of fire-clay brick. B is a casing or jacket of galvanized sheet-iron. C is a cylindrical retort, made of fire-clay or plumbago: this retort is constructed in two horizontal sections $a\,a^1$; the lower section is made solid, and rests at each end on the walls of the combustion-chamber D, and is supported in the middle of its length by a cross-piece, E, also of burnt clay. The upper section of the retort rests on the lower section, the edges being matched to receive each other, and is perforated with apertures, *b b*, to admit the flame and permit the gases from the body to enter the fire-chamber and there assimilate with the products of combustion and be entirely consumed. F F are doors supplied with peep-holes covered with plate-glass, so that the stoker or other persons can witness the incineration if they desire.

The inner door is made of fire-clay, the outer one of wrought-iron with the sheet-iron exterior casing riveted to it; $g\,g^1$ are smoke-flues. $H\,H^1\,H^2\,H^3$ are air-flues at the top and bottom of the furnace, to supply the requisite amount of oxygen to the combustion-chamber, and are provided with registers, *c*, for the regulation of the inflow of air. K is a chamber in which the "oil-burner" is placed to heat the furnace. L is the "oil-burner," which is simply a cone-shaped spiral of one-inch gas-pipe containing a series of perforations through which the oil flows. This spiral burner is connected with a pipe extending under the floor from the furnace to the reservoir situated at some convenient point and fitted with a safety switch-off to prevent the flame from running back into the oil-tank. M, is a crib or cradle made of quarter-inch iron rods connected with longitudinal pieces of one and one-half by one-quarter-inch iron, in which the body is placed before putting it into the retort. This crib permits the attendant to slide the body endwise into the retort, when it is very hot, an operation that could not be performed with a body alone under such conditions, as the body would adhere to the hot sides of the retort before it could be fixed in position for successful cremation.

When the oil is ignited at the cone burner the flame passes up the throat, *e*, of the passage into the combustion-chamber, where the gases expand and ignite, creating an intense heat in a very short time, not obtainable by the use of coke or coal without previous firing during a considerably longer time.

A furnace of this kind can be "run hot" in two hours — so hot as to melt down the iron cradle, if such a degree of heat is desired. We have ample proof of the great heat obtainable from this oil fuel in our glass-furnaces which are heated in this way in this section of country where the oil is cheap, costing about one dollar and twenty-five cents a barrel; one barrel serving to supply the furnace six hours.

I at one time thought of having the bottom of the retort perforated and putting an ash-receiver underneath; but I anticipated trouble with the ashes which would drop through, as they would be liable to be drawn up the smoke-flues. The perforations in the top of the retort serve to admit the flame which attacks the gases forced from the body by the heat of the retort, before they can enter the combustion-chamber, thus lessening the liability of their passing unconsumed up the chimney.

If the body of the furnace and the retort is made quite heavy, they will retain heat much longer than if they are light, and will allow of shutting off the oil-supply at an earlier hour. The cold-air register can be used in cooling the furnace rapidly, due provision having been made for contraction in the construction of the furnace and retort.

Furnaces similar to this have been used in two medical colleges, substantially as here shown, with the exception of the top half of the retort; it not being desirable in their case to take special care of the ashes.

The Le Moyne furnace is intensely practical (it has often been compared to one of the puddling furnaces of our iron-mills), devoid of all religious sentiment, and repugnant in appearance. This I could not conceive necessary or excusable. While economy was an important factor in the final disposal of the dead, yet the times did not require, to my thinking, such parsimony as was foreshadowed by the venerable pioneer, and therefore I designed a furnace and crematory that would at least serve as the basis from which might be evolved at some future time a successful mode of cremation, both from a practical and æsthetic standpoint.

In conclusion, I would say that the invention has not been patented, and if any of the suggestions are valuable to any one, they are welcome to use them. In making this contribution to the history and science of cremation, I present the result of my experiments to those who are interested in this mode of disposing of the dead. While I am inclined to think the furnace here shown would be perfectly satisfactory for a thinly populated section of country, specially where oil is cheap, yet if called upon now to build a public furnace for this purpose, and the business would justify it, I would adopt a "hot-blast furnace" in which the fires would be kept constantly burning. The first cost of course would be greater, but the end would justify the increased expenditure.

I am most respectfully,

Stanton M. Howard.

STEAM-METERS.

Boston, May 20, 1880.

To the Editor of the American Architect:

Sir, — In our May 15 number of your journal I notice an inquiry for a steam meter.

There was a patent issued to Mr. M. W. Kidder, of Lincoln, Mass., October 7, 1878, for a meter to perform the function required. The principle of the invention, which is fully covered by the patent, is to measure the amount of steam used by the quantity of condensed steam caught in the meter, the weight of which is registered.

Any communication addressed to Mr. Kidder, as above, or to Wright & Brown, his patent-solicitors, would meet with response, I have no doubt. I understand that Mr. Kidder has some of the meters in successful operation.

Very truly, Geo. W. Pierce.

NOTES AND CLIPPINGS.

Lacustrine and Roman Remains at Milan. — Remains of lake-dwellings have been discovered in a peat-bog near Milan, and in a street in Milan excavations for a house have brought to light what are believed to be the vestiges of the old Roman theatre.

Travelling Stones. — Many persons have doubtless heard of the famous travelling stones of Australia. Similar curiosities have recently been found in Nevada, which are described as almost perfectly round, the majority of them as large as a walnut, and of an irony nature. When distributed about upon the floor, table, or other level surface, within two or three feet of each other, they immediately begin travelling towards a common centre, and there lie huddled like a lot of eggs in a nest. A single stone removed to a distance of three and a half feet, upon being released, at once started off with wonderful and somewhat comical celerity to join its fellows: taken away four or five feet it remains motionless. They are found in a region that is comparatively level, and is nothing but bare rock. Scattered over this barren region are little basins, from a few feet to a rod or two in diameter; and it is in the bottom of these that the rolling stones are found. They are from the size of a pea to five or six inches in diameter. The cause of these stones rolling together is doubtless to be found in the material of which they are composed, which appears to be lodestone or magnetic iron ore.

The Eads' Ship-Railroad. — The first section of a bill lately presented to the House Committee on the Inter-Oceanic Canal incorporates, in the usual phraseology, Mr. Eads and his associates as the Inter-Oceanic Transit Company. The second section empowers the company to acquire and secure from the persons or governments controlling the rights of way, territory, harbors, and other necessary things, such rights, privileges, and concessions as may be necessary. The third section provides that if the company shall begin the construction of the railway within two years from the passage of the act, and shall prosecute the work diligently to completion, similar rights shall not be granted by the United States to any other company, either for a ship-railway or canal across the Isthmus, for fifty years. The fourth section provides for detailing two ships of war, properly officered, manned, equipped and provisioned, to assist in making all necessary preliminary surveys. The fifth section appropriates $100,000 for the expense of such surveys. The sixth section provides that when, in the presence of a board of engineers, appointed by the President, a vessel of not less than 4,000 tons displacement shall be safely and promptly transported across the Isthmus on such ship-railway, the guaranty and obligations of the Government shall at once attach. The seventh and remaining sections give the guaranty of the United States to the stockholders (the stock not to exceed $50,000,000) for a dividend of six per cent for thirty years from the date of the transportation of such first vessel, authorizes the company, if its road shall exceed forty-five miles in length, to issue mortgage bonds to the amount of $500,000 for every mile in excess, and provides for the repayment to the Government, by bonds and sinking fund, of such sums as may be paid by it under such guaranty of dividend.

Architects' Fees. — The *Athenæum* mentions the comment of Lord Chief Justice Coleridge in his charge to the jury in the case of an engineer's suit for the regular commission of one and one-half per cent on certain architectural work (see *American Architect* for May 15, 1880), and expresses the hope that the decision will "tend to abrogate the present system of payment to architects and others, and substitute for it some rational and *honorable* mode." We confess that we are surprised to find a journal of the standing of the *Athenæum* allowing itself to indulge in so wholesale an insult as is implied in the word we have italicized.

A new Parisian street has been named after Viollet-le-Duc.

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BUILDING INTELLIGENCE.

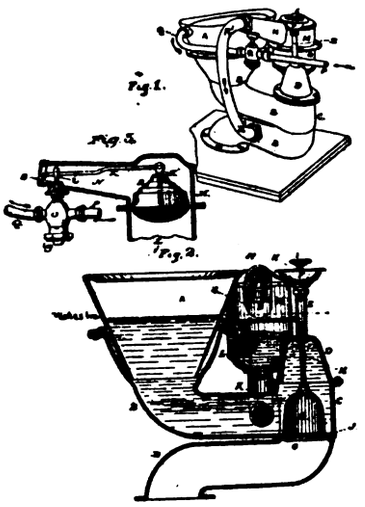
[Reported for The American Architect and Building News].

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

226,338. WATER-CLOSET. — George Milne and Wm. H. Gants, San Francisco, Cal. This closet depends for security against sewer-gas on the sealing water, kept its in place by the valve G; the water standing in the bowl, A, the valve-chamber, M, and the tube, E, through which the rod of the pull-up handle works.



The valve, G, fits closely to its seat in the bottom of the upper arm, B, of the outlet-pipe by means of a rubber gasket. When this valve is raised to empty the bowl it rises into a chamber of similar shape to its own external form, in such a way that no solid matter can be lodged upon it. M is a chamber in which is a ball-float, as shown in Fig. 3, which is suspended from a a lever, *x*, which has its fulcrum at the other end. Depending from this lever, between the fulcrum and the ball-float, and nearer the former than the latter, is a pin, *i*, which is connnected with a ball-valve in the valve-chamber, *o*, of the supply-pipe, P; thus when the bowl is emptied by the raising of G, and the level of the water in the chamber, M, falls, the ball-float falls, and the pin, *i*, is so depressed that it moves the ball-valve in *o*, and a fresh supply of water is admitted to the bowl, ceasing to flow when by the rising of the ball-float the pressure of *i* is removed from the ball-valve. The overflow is effected through the pipe, R', shown in Fig. 1, which connects the chamber, M, with the lower arm of the outlet-pipe, below the valve, G.

227,614. AUTOMATIC SEWER-TRAP. — Matthew B. Cowden, Harrisburgh, Pa.

227,642. REVERSIBLE LATCH. — Milton C. Niles, Oak Park, Ill.

227,668. BRICK-MACHINE. — William B. Aitken, Philadelphia, Pa.

227,682. COMPOSITE ROOF. — S. L. Foster, and W. H. Benton, Philadelphia, Pa.

227,686. VISE. — Joseph Goodrich, Henry, Ill.

227,702. EAVES-TROUGH HANGER. — Ferdinand Otto, Springfield, Ill.

227,709. — MEANS FOR HEATING AND VENTILATING. — Calvin M. Woodward, St. Louis, Mo.

227,712. DOOR-SECURER. — Joel Armstrong, Marysville, O.

227,725. KEYHOLE GUARD. — Josiah H. Browne, Salem, Mass

227,758. MACHINE FOR CUTTING STONE. — Samuel B. Frank, Nashville, Tenn.

227,765. WRENCH. — L. and A. S. Gray, Middletown Springs, Vt.

227,766. SCHOOL-HOUSE STOVE. — John Grossius, Cincinnati, O.

227,768. PIPE-WRENCH. — Griffith W. Griffiths, Tecumseh, Mich.

227,773. COMBINATION TOOL. — Dominikus Hartmann, Mansfield, O.

227,796. AIR-COOLING APPARATUS. — Oscar Kropff, Nordhausen, A. H., Germany.

227,799. ELEVATOR SAFETY-STOP. — Frank Laufkotter, Collinsville, Ill.

227,815. SAW. — Eli Morris, New Haven, Conn.

227,830. HYDRAULIC PIPE. — Daniel G. Phipps, New Haven, Conn.

227,866. ELEVATOR. — Alcibiades J. Whittier, Chelsea, and R. S. Whittier, Hyde Park, Mass.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since our last report:

A. A. Reinhardt, 16 three-st'y brick buildings, Bolton St., between Mosher and McMechen, each 19' 3" x 60'.

William Dryden, three-st'y brick dwell., Hillen St., near Gay.

Mrs. M. A. Dale, three-st'y brick dwell., Gilmor St., between Edmonson and Harlem Aves., 18' x 60'.

James Bates, 2 three-st'y brick buildings, Lombard St., near Dallas St.

A. Hoen, six-story brick and stone warehouse cor. Holliday and Lexington Sts., running back to North St.

E. J. Mullen, 8 three-st'y brick dwells., cor. Carey and Mosher Sts.

Samuel Black, 6 three-st'y brick buildings, on Harlem Ave., near Stricker St.

R. W. Cabor, six-st'y brick and stone warehouse, on German St., near Charles.

R. W. Cabor, six-st'y brick and stone-warehouse, Charles St., near German St.

CHAMBER OF COMMERCE BUILDING. — The new building is to have a frontage of 82 feet on Second St., and 187 feet on Holliday St., and 187 feet on Post Office Ave., the first three stories will be used for offices, of which there will be 60, and the fourth floor will be used entirely for the exchange-room, which will be 76'6" x 180'. The building will cost $225,000 or $250,000, and the lot has been purchased for $200,000 Messrs. John R. Niernsee & Son are the architects.

DWELLING. — Mr. Robert Hodges is about to build a new dwelling on St. Paul St., near Chase, to be 21 feet front by 80 feet deep, three stories high, and Mansard roof, and English basement. It will have white marble front, with buff terra-cotta finish. Cost, $15,000. Mr. Chas. L. Carson is the architect.

PRINTING-HOUSE. — Messrs. A. Hoen & Co., lithographers, have purchased a lot of ground, 48' x 188', on Lexington St., extending from North to Holliday Sts. The firm proposes to build on the lot a six-story building to be used for their lithographing establishment.

SEMINARY. — Mr. E. F. Baldwin is preparing drawings for an addition to St. Mary's Seminary, on No. Paca St., consisting of the north wing, the south and centre wings, which were built three years ago, with the new wing will make a building 256 feet front, and five stories high. It is to be of brick and stone.

Brooklyn.

ALTERATIONS. — *Court St.*, cor. Joralemon St., front alterations on Joralemon St.; cost, $2,500; owner, D. A. Robbins estate; builders, Long & Barnes.

Hicks St., No. 122, cor. Clark, one-st'y brick extension, 17' x 19'; cost, $2,200; owner, Estate R. T. Hicks; architect, E. H. Burnett; builders, J. W. Campbell and E. H. Burnett.

BUILDING PERMITS. — *Greene Ave.*, 2 three-st'y brown stone dwells., 18' x 45'; owner, J. Doherty, No. 598 Quincy St.

St. Mark's Ave., Nos. 34-42, 6 three-st'y brown stone dwells., 16' 8" x 82'; cost each $3,750; owner, G. M. Chapman, Rahway, N. J.; builder, P. J. Cootey.

Vanderbilt Ave., 3 three-st'y brown stone dwells., 17' x 45'; owner, Mrs. M. L. Brundage; architect, G. L. Morse; builder, P. J. Carlin.

Rutledge St., 4 two-st'y brown stone dwells., 19' x 40' x 45'; owner and builder, Richard Healey, 95 Lynch St.; architect, Isaac D. Reynolds.

Rutledge St., cor. Lee Ave., 1 three-st'y brown stone store and dwell., 21' x 60'; owner and builder, Richard Healey, 95 Lynch St.; architect, Isaac D. Reynolds.

Oxford St., 1 four-st'y brown stone dwell., 23' x 50' 8"; cost, $11,000; owner, Charles O. Wolcott, 5 St. Felix Street; architect, G. L. Morse.

First Pl., No. 118, 1 three-st'y brown stone dwell., 25' x 50'; owner, Catharine E. Cleveland; architects, Parfitt Bros.; builders, M. J. Reynolds and Hartt & Boyd.

Vanderbilt Ave., 3 three-st'y brown stone dwells., 18' x 45'; owner, A. Purdy; builder, L. W. Seaman, Jr.

Prospect Ave., Nos. 208 *and* 210, 2 two-st'y brick dwells., 18' 9" and 18' x 38'; cost, $2,200 each; owner, Thomas Pitbladdo, 213 Seventeenth St.

North Eleventh St., No. 58, two-st'y frame factory, 92' x 40'; owners and builders, Jordan Iron & Chemical Co.; architect, H. W. Pedler.

South Ninth St., 1 three-st'y brown stone tenement, 25' x 55' 10"; cost, $9,000; owner, John Brown, on premises; architect, C. C. Buck; builders, S. J. Burrows and S. L. Hough.

Tiffany Pl., 1 five-st'y brick factory, 65' and 64' x 97' 5"; cost, $17,000; owner, Robert S. Hobbs, Orange, N. J.; architect, Jno. Mumford, builders, J. H. Stevenson and B. Gallagher.

Raymond St., 10 two-st'y brick buildings on Raymond St., 14 two-st'y brick dwells. on Tillary St., 10 two-st'y brick dwells. on Sycamore St., being thirty-four houses in all; total cost, $56,000; owners, Jackson S. Schultz, *et al.*, New York; architect, R. Maynicke; builders, F. J. Kelly and Morris & Selover.

Boston.

BUILDING PERMITS. — *Brick.* — *Marlborough St.*, for E. & A. S. Sever, 1 dwell., 20' x 45'; B. F. Dewing, builder.

Rays St. cor. Lamartine St., 1 button-factory, 50' x 160'; Richardson & Young, Fiedler, Moeldner & Co., owners.

2105 *Washington St.*, for May & Gardner, 1 store, 45' x 57'; Burnham & Demett, builders.

Commercial St., cor. Foster St., for M. E. Parks, 1 tenement-house, 24' x 54'; G. H. Young, architect.

Wood.—I St., South Boston, for James E. Bowe, 1 dwell., 22' x 30'; three stories.

21 *Bainbridge* St., for S. Whelan, 1 dwell., 22' x 33'; R. Scott, builder.

Short St., Ward 23, 1 soap-factory, 25' x 30'; W. H. Priesing, builder; F. Karcher, owner.

Everett St., Ward 2, for A. Killop, 1 dwell., 20' x 32'; A Campbell, builder.

Winship St., for J. Galligan, 1 shop, 24' x 36.'

Blue Hill Ave., for J. C. E. Goward, 1 dwell., 21' x 34'; C. Tilley, builder.

Blue Hill Ave., cor. Columbia St., 1 restaurant, 25' x 60'.

East Sixth St., South Boston, for O. F. Seanman, 1 restaurant, 48' x 48'; W. M. Henderson, builder.

Chicago.

CHURCH. — The corner-stone of a large and costly Swedish Lutheran church, at the corner of May and Huron Sts., was laid May 23, by the Rev. Hurm Carlson.

GRAIN ELEVATOR. — Messrs. Munger & Wheeler are building a grain elevator for the Chicago & Northwestern Railroad, which will have a capacity of 1,500,000 bushels.

Cincinnati.

Mr. Jas. W. McLaughlin, architect, has the following work in his office: —

A dwelling house for Mr. M. A. Spencer, on Seventh St., opposite Smith St., 30 feet front, stone front, 12 rooms, $8,000.

An office-building for the Howard Oil Company at Houston, Texas; brick, cost, $5,000.

A. F. Bosche, Esq., frame dwelling, Avondale, cost, $7,000.

Milwaukee.

The following building permits have been issued since the last report: —

Myer Friend, brick dwell.; cost, $11,000.
J. B. Martin estate, brick store; cost, $15,000.
F. J. Bauer, brick malt house; cost, $4,000.
Brand & Co., brick warehouse; cost, $3,000.
G. Roppert, brick store; cost, $2,000.
Street Railway Co., brick barn; cost, $10,000.
John Lipps, brick store; cost, $20,000.
Conrad Bach, brick store; cost, $7,000.
Christ. Templin, brick store; cost, $7,000.
Christ. Schunehnecht, brick dwell.; cost, $4,000.
N. Newschowalter, 2 frame dwells.; cost, $9,000.
Walter Nicholson, frame dwell.; cost, $1,500.
D. Wait, frame dwell.; cost, $2,000.
Albert Cleary, frame dwell.; cost, $1,200.
Peter Kneisler, frame dwell.; cost, $1,200.
Peter Smith, frame dwell.; cost, $2,200.
Wm. Casper, addition to frame dwell.; cost, $2,300.
Mrs. Clark, addition to frame dwell.; cost, $2,000.

New York.

ALTERATIONS. — *Madison Ave., No.* 89, a fifth story to be added; cost, $4,500; owner, Dr. Emmet; architect, Thomas R. Jackson.

West Forty-Fifth St., No. 40, a fourth story to be added; cost, $2,500; owner, Mrs. Sarah F. Schmidt; architect, Charles J. Berg; mason, M. Reid; carpenters, Steele & Costigan.

Henry St., No. 263, to be raised to four stories, also a four-st'y brick extension, 24' x 18'; cost, $3,000; owner, George Graham; architect, G. Inslee.

East Thirty-Ninth St., No. 119, three-st'y brick extension on rear, 7' x 15'; cost, $2,500; owner, Col. R. M. Hoe; architect, J. C. Cady; builder, A. T. De Puy.

Lexington Ave., No. 161, cor. Thirtieth St., three-st'y brick extension, 22' x 37'; cost, $3,500; owner, Thos. J. McCahill; architects, D. & J. Jardine.

Thirtieth St., No. 123, three-st'y brick extension, 25' x 36'; cost, $2,000; owners, Swift & Co.; architect, S. McKimmin; builder, J. Noble.

First Ave., five-st'y brick extension on rear, 25' x 60'; cost, $8,000; owner, Stevenson Towle; architect, A. Burgess; builder, Wm. Pettit.

Water St., Nos. 323, 325 *and* 327, internal alterations; cost, $6,000; owner, Miss Ellen Collins; architect, H. R. Marshall; masons, J. and W. C. Spear; carpenter, Thomas Overington.

East Nineteenth St., No. 341, a fourth story to be added, four-st'y extension, 14' 6" x 26', and internal alterations; cost, $5,500; owner, G. W. Folsom; architect, Julius Boekell.

Sixth Ave., No. 808, one-st'y brick extension, 18' 9" x 25 to be built on rear, new store front in first story, and internal alterations; cost, $2,600; owner, Capt. J. Grafton; architect, M. C. Merritt.

Sixth Ave., cor. Nineteenth St.; four-st'y brick extension, 51' x 103 x 122' 6" on rear; cost, $70,000; owners, B. Altman & Co.; architects, D. & J. Jardine.

East Sixty-Second St., No. 15, two-st'y brick extension, 17' x 34' on rear; cost, $5,000; owner, Joseph Bell; architect, James E. Ware; builder, John Downey.

Bowery, Nos. 104 *and* 106, front building to be altered internally, to be occupied as a theatre; cost, $27,000; owner, M. Herrmann; architect, Wm. Jose.

BUILDING PERMITS. — *Eighty-Sixth St.*, 4 four-st'y brick (brown stone front) apartment houses, 30' x 68; cost, each, $12,000; owner, John Ledwick, 132 Nassau St.; architect, Charles Baxter.

One Hundred and Twenty-Second St., 5 three-st'y brick (brown stone front) dwells., 14' x 43'; cost, $9,000 each; owner and builder, A. B. Birdsall, 108 East Twenty-Third St.; architect, J. H. Valentine.

Fifty-Third St., 4 four-st'y brick (brown stone front) dwells., two 22' x 65' each; two 25' x 63' 8" each; cost, $28,000 each; owner and builder, R. W. Buckley, 163 East Fifty-Fourth St.

Pitt St., No. 136, three-st'y brick hotel, 25' x 52'; cost, $8,000; owner, F. Becker, 138 Pitt St.; architect, A. H. Blankenstein.

West Forty-Second St., No. 420, five-st'y brick tenement and store, 25' x 72'; cost, $15,000; owner, Daniel McDonald, 515 West Forty-First St.; architect, John M. Forster.

Eleventh Ave., cor. Twenty-First St., four-st'y brick factory, 49' 4" x 65'; cost, $15,000; owner, John McClave, Twenty-Second St. and Eleventh Ave.; builder, Wm. B. Pettit.

One Hundred and Twenty-Eighth St., 3 three-st'y brick (brown stone front) dwells., each 19' 4" x 50'; cost, each $10,000; owner and builder, F. A. Thurston, 62 East One Hundred and Thirty-Third St.; architect, Theo. Dieterlin.

Twenty-Third St., 2 brown stone front, five-st'y apartment houses, each, 29' 6" x 100'; cost of each $25,000; Edward Cunningham, builder and owner; Messrs. Thom & Wilson, architects.

West Thirty-Eighth St., No. 254, a five-st'y, brown-stone-front apartment house, 25' x 88'; estimated cost, $18,000; Samuel McMillan, owner and builder; Messrs. Thom & Wilson, architects.

Eleventh Ave., cor. Twenty-First St., a brick four-

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st'y factory, 49' x 65'; estimated cost, $15,000; John McClave, owner; William B. Pettit, builder.

One Hundred and Twenty-Eighth St., 3 brown-stone front three-st'y dwells., each 19' x 50'; estimated cost of each $10,000; F. A. Thurston, owner and builder; T. O. Disterlen, architect.

Hudson St., No. 71, a five-st'y brick store, 25' x 93' 2"; estimated cost, $17,000; David Martin, owner; Amsi Hill, architect; John P. Suley, builder.

East Seventy-Eighth St., No. 353, a four-st'y brick stable and workshop, 25' x 102'; estimated cost, $3,000; Edward Kilpatrick, owner and builder; D. & J. Jardine, architects.

One Hundred and Forty-Fourth St., 4 three-st'y frame dwells., each 12' 6" x 50'; estimated cost of each, $900. John Mueller, owner; Wm. Graul, architect.

Asylum. — A deaf and dumb asylum is to be built at Sixty-Seventh St. and Lexington Ave., of brick and stone, 152' x 100' 8"; Mr. H. J. Fernbach, architect.

Factory. — A factory is to be built for Messrs. Christy, Sheppard & Garrett at No. 510 West Twenty-Third St. It will be of brick. Mr. P. R. Jackson is the architect.

Hospital. — A pavilion for the German Hospital, Seventy-Sixth St. and Fourth Ave., 30' 6" x 18" is to be erected at a cost of $8,000, from designs of Messrs. H. J. Schwarzmann & Co.

Philadelphia.

Alterations. — 3815 *Frankford Ave.*, addition to factory, 27' x 36'; owner and builder, James Crook.

Addition. — 1549 *Germantown Road*, three-st'y addition to building, 12' x 24'; owner, George Mousley.

Dye House. — *Ridge Ave.*, near Shurs Lane, one-st'y dye-house, 16' x 50'; owner, G. J. Littlewood.

Factories. — *Swanson* and Parham Sts., rebuild factory, 25' x 34'; owner, Henry Stillwell.

Factory St., near Adams, one-st'y factory-building, 40' x 40'; owner, W. Banett.

Hotel — The Pennsylvania R. R. Co., has purchased the property on Market St., between Merrick and Fifteenth, running back 116 feet. This space will be occupied by the new Depot Hotel. Price, $150,000.

Houses. — *Morton St.*, cor. Johnson St., three-st'y dwell., 45' x 51'; builder, John Hirst.

Schem St., north of Poplar St., three-st'y dwell., 16 x 26; owners, Lawson & Brenizer.

Fairhill St., south of Cumberland, 6 two-st'y dwells., 14' x 44'; builder, H. M. Housekeeper.

Fifth St., near Butler, 4 two-st'y dwells., 15' x 40'; owner, Henry Gill.

1214 *Ellsworth St.*, two-st'y dwell., 16' x 27'; builder, A. Taylor.

Forty-ninth St., cor. Chestnut St., two-st'y dwell., 32' x 42'; builder, J. A. Sloan.

1812 *Thompson St.*, three-st'y dwell., 23' x 42'; builder, Thomas Seeming.

Sumac St., near Righter, 1 three-st'y dwell., 23' x 60'; builder, W. Goodfellow.

Stores. — 422 *West Girard Ave.*, three-st'y store and dwell., 14' x 36'; builders, W. Dickinson & Bros.

Ridge Ave., opposite Queen St., three-st'y store and dwell., 20' x 52'; builder, Charles Bartle.

Messrs Strawbridge & Clothier, the wholesale and retail dry goods merchants, cor. of Eighth and Market Sts., have under way an extensive improvement, 24' x 205'; cost, about $100,000; architects and builders, Balderston & Hutton.

Storehouse. — *Catharine St. Wharf*, one-st'y storehouse, 30' x 100'; owners, Knickerbocker Ice Co.

Railroad Offices. — The Reading R. R. Co. have purchased the property directly in the rear of their present building, on Fourth St. and Willerigo Alley, and are demolishing the old buildings preparatory to building a large addition to their present quarters. Architect, Mr. Frank Furness.

Refinery. — At *Point Breeze*, one-st'y refinery, 100' x 197'; owners, Philadelphia & Point Breeze Refinery.

St. Louis.

Building Permits. — Forty-four permits have been issued since our last report, four of which are for frame structures of slight importance. Of the rest, those worth $2,500 or over are as follows: —

Owners Name.	Use.	Stories.	Rooms.	Cost.
A. McChesney,	Dwell.	3	10	$4,800
Chas. Peck,	Dwell.	4	4	9,600
Geo. F. Dorris,	Store.			12,000
William Bosbyshell,	Stable.	2	2	3,500
J. Vasel,	Dwell.	3	16	3,800
W. L. Wickmire,	Church	2		7,000
City of St. Louis,	Police St'n.	2	2	2,000
A. Kutage,	Dwell.	3	12	3,000

Sacramento, Cal.

The following buildings are in course of construction under Cook & Clark, architects, Sacramento City, Sacramento Co., California.

Hotel. — Altering "Orleans Hotel" into large paint and oil salesrooms for Whittier, Fuller & Co.; cost, $8,000.

Additions to Union Hotel, cor. K and Second Sts., to contain fifty-three rooms; cost, $18,000.

Houses. — H St., between Eighth and Ninth Sts., two-st'y frame dwell.; cost, $5,000; owner, Herman Steinmann; contractors, E. A. & J. S. Booyer.

I St., between Tenth and Eleventh Sts., two-st'y frame house; cost, $2,000; owner, Geo. W. Lorenz; contractors, Pike & Seaman.

L. St., between Fourteenth and Fifteenth Sts., frame house, brick foundation, all modern improvements; cost, $4,000; owner, S. W. Butler; contractors, Pike & Seaman.

Front St., between V and W Sts., cottage residence for Thos. Hayne; cost, $2,000; Neff & White, contractors.

Remodelling brick dwelling for Henry Hausche, on Fourth St., between M and N Sts.; cost, $2,500; contractors, E. A. & J. S. Booyer.

O St., between Fifteenth and Sixteenth Sts.; frame house; cost, $3,600; owner, P. S. Lawson; contractors, Miles & Bro.

G St., cor. Fifteenth, frame house; cost, $3,000; contractor, Wm. H. Mead; owner, S. Wren.

Residence on Fourth St., between N and O St., for M. Levi; cost about $2,500.

Store. — Remodelling "Clunie Block," corner Eighth and K Sts.; owner, Thomas J. Clunie; cost, $15,000.

Store and residence on K St., between Front and Second Sts.; owner, Geo. Schroth; work doing by the day.

General Notes.

Beverly, Mass. — The new school-house at Dodge's Row is to be built by Wm. E. Perkins, of Centreville.

Bryn Mawr, Pa. — The late Dr. Jos. W. Taylor, of Burlington, N. J., by his will left $850,000 confided to trustees, for the purpose of building and endowing a college for the education of females, at Bryn Mawr, Pa. The trustees of this legacy have been duly incorporated under the name of "The Trustees of Bryn Mawr College." The construction of the buildings will now be steadily prosecuted. Francis T. King, of Baltimore, is the President; Addison Hutton, of Philadelphia, is the architect.

Dorchester, Mass. — A house for Gen. Hazard Stevens is now building on Mt. Bowdoin Ave., from designs of Mr. O. E. P. Newcomb, architect, of Boston. The building measures 40' x 60'; the first story is of brick, and the second of open-timbered work. S. T. Waters & E. E. Chapin, builders.

On Melville Ave., a double house for Chas. Bush and E. S. Farwell is approaching completion; J. F. Haynes, builder; O. E. P. Newcomb, architect.

Dumont, Io. — S. B. Dumont, Esq., of this place, is making preparations to build a hotel, 76' x 60', two stories. F. D. Hyde, architect, Dubuque, Io., is preparing the plans.

East Greenwich, R. I. — The Baptist Society is now contemplating the building of a new church in another location. Nothing has yet been definitely settled.

Fall River, Mass. — The foundation for St. Joseph's Church, on North Main St., opposite the North Burial Ground, is nearly all in.

Folsom, Cal. — The last legislature appropriated $40,000 for the completion of the branch prison at Folsom. Cook & Clark have the work under way. Most of the labor will be by prisoners.

Industrial.

Amherst, Mass. — Workmen are clearing away the ruins of the Hills Company's factories, and the works are to be rebuilt at once. The main factory is to be four stories high, and will be built on two sides of a square, each wing to be 100 feet long. There are also to be three other buildings, two stories high, one 36' x 40'; one 30' x 36', and the third 32' x 60', and 2 one-story buildings for bleacheries, each 30' x 50'.

Boston, Mass. — A factory, 160' x 50', two stories in height, is to be built on Lamartine St., near Boylston Station, for Fielder, Melchner & Co.

Chicago, Ill. — Thomas Gaunt, Yonkers, constructing engineer and architect of the buildings and machinery of the Chicago Steam Sugar Refining Company, has prepared plans and specifications for the new buildings of the company to be erected at Chicago. The sugar house building will be 330' x 150', thirteen stories high; filter house, 150' x 70', and 130' high; boiler house, 240' x 100', and 50' high; chimney, 250' high, with a flue of 16'.

Greenfield, Mass. — Newell Snow has begun on the foundation for a new brick factory, 100 feet long, on the site of the old Green River foundry works.

Lynn, Mass. — Samuel M. Bubier is building a new shoe factory, 80' x 20', and three stories high.

Lock Haven, Pa. — Armstrong & Dixon, of Philadelphia, are about to erect a large wood pulp mill at Lock Haven.

Milford, Mass. — Estabrook & Wires are building an addition to their factory, 22' x 40'.

North Lyme, Conn. — James Bingham has removed to Pleasant Valley, where he is building a new paper mill.

Tacony, Pa. — Henry Disston & Sons are building a large rolling mill.

Taunton, Mass. — H. A. Williams & Co. have broken ground for their new factory near the Weir Junction depot. The main building will be 150' x 35', three stories, built of wood; the boiler and furnace house, of brick, 30' x 35', one story.

Bids and Contracts.

Albany, N. Y. — The new Capitol Commissioners have awarded the contract for gas fitting to Frederick Tudor & Co., of Boston, for $7,940.

Baltimore, Md. — Messrs. S. H. and J. F. Adams have been awarded the contract for the new warehouse for the Trustees of Johns Hopkins University, on Sharp St., near Lombard, at $90,000; Dixon & Carson are the architects.

Chicago, Ill. — The Chicago, Milwaukee & St. Paul Railroad has awarded the masonry contract on the new viaduct on Desplaines St., to S. Bryan.

Dedham, Mass. — The contract for the extension of the Norfolk county jail is awarded to Albert Currier, of Newburyport, for $17,800.

Easthampton, Mass. — The Bartlett Brothers, of Whately, have been awarded the contract to build the new library building for $16,000.

Newark, O. — The contract for building the new Pan Handle Depot has been awarded to Levi Furgerson and Chas. Daugherty, for $16,000.

Philadelphia, Pa. — The Phœnix Iron Company, of Trenton, N. J., are the successful bidders for the contracts to build two lighthouses on the Delaware River, below Philadelphia. They are to be of the fourth order, with iron cylinder towers eight feet in diameter, surmounted by watch-rooms and lanterns, with a focal plane ninety-eight feet nine inches above their base.

Youngstown, O. — The contracts for the new store of E. M. McGillin & Co., which is to be three stories high, and to measure 80' x 200', have been awarded to S. Bridgeford, of Sharon, for the brick-work, and R. Weslow, of Cleveland, for the carpentry. Walter Blythe, of Cleveland, is the architect.

Irondale, Ill. — Mr. Patrick Conboy has been awarded the contract for building the Methodist Episcopal Church. It will cost $3,500.

Pittsburgh, Pa. — The Connellsville Iron and Coke Company will build forty dwelling houses. B. W. Rankin, McKeesport, has the contract.

Ripley & Co. are to build a three-story building, to give additional stock room and storage facilities.

Public Buildings.

Boyse City, Idaho. — The House Committee on Public Buildings and Grounds recommends an appropriation of $50,000 for a public building.

Columbus, O. — The House Committee on Public Buildings and Grounds, has agreed to make favorable reports upon the bill for the erection of a public building, cost not exceeding $200,000.

Council Bluffs, Io. — $100,000 for a public building are recommended by the House Committee on Public Buildings and grounds.

Fort Wayne, O. — The House Committee on Public Buildings and Grounds has agreed to make favorable reports upon the bill for the erection of a pubic building; cost not to exceed $100,000.

Milton, Pa. — A bill to appropriate $25,000 to build a public building for this unfortunate town passed the Senate, May 19.

New Albany, Ind. — The House Committee on Public Buildings and Grounds recommends an appropriation of $75,000 for a public building.

There are some fifty bills on the calendar authorizing the construction of buildings whose cost would g gregate almost $7,000,000.

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THE accident at Madison Square Garden gave a fresh impetus to a movement which began a year or more ago for the displacement of Mr. Dudley, the Superintendent of Buildings for the city of New York. His conduct in evading the commands of Mayor Cooper regarding the plans of the ill-fated Garden was perhaps the final provocation which has induced that official to apply to the Governor of the State to have Mr. Dudley removed, reciting a variety of charges which have been accumulating against him. About some of these, which relate to personal misconduct, we know and can say nothing, but it seems to us that others show perhaps an unreasonably vindictive spirit on the part of his pursuers. For instance, he is arraigned for appointing persons as deputy inspectors who were not certified to be competent after examination by a committee of the American Institute of Architects, but the Institute laments in its report the lack of proper candidates at its examinations, and he may have had to keep his list of inspectors full as best he could; and his discretion under the law is so large in setting aside the provisions of the statute upon occasion that it seems harsh to make the exercise of it a ground of accusation against him, unless corrupt motives can be shown. That he erred sometimes in judgment is shown by the Madison Square Garden occurrence, but we would earnestly deprecate any attempt to shield the real culprit in that sad case behind an unpopular official, whose responsibility was as much secondary to that of the designer of the building as the fault of an inattentive policeman is less than that of the burglar who takes advantage of his carelessness to commit crime.

THE change in the administration of the New York law, by which the control and supervision of building operations will in future be committed to the Fire Department, so far from being a blessing, as some of the papers consider it, we look upon as a serious misfortune, a retrograde step which is sure to result in grave calamity. No doubt it is important to have buildings more secure against fire than they now generally are, but that is not all. The New York statute as now administered requires a mode of construction which if far from fireproof, is at least safer than that customary in the smaller towns, and by better coöperation of the two independent departments might be still more improved, while the less obvious but equally important details of construction which occupy a large part of the attention of the Building Department, must inevitably be more or less neglected in an office where the idea of fire as the element to be guarded against predominates over all others. The failure of the floors in a flour warehouse the other day illustrates a class of accidents which are becoming daily more frequent, and which only rigid inspection, quite different from that which a Fire Department would give, can prevent, and against which there is no insurance.

A DANGER which has often been pointed out in this journal has received a practical illustration in New York. At half-past two o'clock one night last week fire originated somewhere in the basement of the four-story apartment-house on the corner of Eighth Avenue and Fortieth Street. The flames and sparks were immediately drawn up through the elevator-shaft by the strong current which invariably exists in such places, and burned in the roof until this was destroyed and the fire became visible from the street, the inmates remaining unconscious of their danger until the alarm was given from outside, waking them barely in time to escape with their lives. We know of several splendidly-fitted buildings of this kind, six or seven stories high, where all the elevators run in the open wells of wooden staircases. How their occupants could get out in case of the bursting of a gas-pipe or a barrel of kerosene in the basement, we are unable to imagine. In some cases there is provided a "fire-escape," consisting of a vertical iron ladder, with rungs two or three feet apart, attached to the outside wall. It would tax the strength of most men to descend by it, under the best of circumstances, while for women or children it is practically useless.

THE perils of apartment-houses are small compared with those which operatives in the upper stories of city warehouses often have to encounter. In a report upon the late destructive fire in the Beebe Building, in Winthrop Square, Boston, the experts, after condemning the inflammable construction of the building, call attention to the fact that the only access from below to the upper stories, in which two hundred and fifty persons were daily employed in the manufacture of clothing, was by means of one wooden staircase, two and one-half feet wide, and ask if there is no mode of compelling manufacturers to provide their operatives with adequate means of escape in case of fire. There has long been a law in Massachusetts providing for just such contingencies, but it has been feebly enforced, if at all: now, however, a new statute has been passed, to the same effect, and we are informed that "this one is to be enforced." We hope that our information is true, but confess to having grave misgivings that the same causes which led to the relaxation of the former rules will apply with equal effect to the new one. This particular fire happened to occur a few minutes before beginning work in the morning, so that no one felt obliged to think of the poor girls who had escaped a horrible death by a hair's breadth as otherwise than unusually fortunate. Another time, when the flames shall break out a little later in the day, the sight of the mortal terror and despair of a hundred human beings may nerve public opinion to demand an expenditure for protecting the lives of the helpless employés in our magnificent buildings, of at least a thousandth part the sums lavished to attract the careless passer-by.

THE memorial which we published two weeks ago, drawn up by architects of the Province of Ontario for presentation to the Commissioner of Public Works in relation to the terms of the competition for new public buildings at Toronto, was signed by about sixty of the profession, and submitted to the Commissioner last week by a deputation consisting of Messrs. Langley, Strickland, Smith, Connolly, and Lalor. The deputation was courteously received, and its arguments listened to with attention, the Commissioner finally replying that though the terms as published had been adopted after consultation with experts he would postpone the date for receiving drawings to October 15. This is better than might have been expected. It is well understood that after terms of such a kind are published, any one who goes to work in good faith in accordance with them creates a sort of contract between the Government and himself, and a subsequent modification of them without timely notice to him, might, if it were to operate to his disadvantage, give him a valid claim for damages. There are so many chances that a second notice may escape the attention of those who have received the first, and that ground may be given for complaint, that it is only prudent to be extremely cautious in modifying terms once published. We believe, however, that Mr. Fraser has taken every precaution to protect both himself and intending competitors from any injury that might arise from the extension of time. The proper time to influence those who intend to invite competing designs is before the publication of the invitation, and the best mode of exerting that influence in a way to make it applicable to all cases is for respectable architects to agree not to invade their neighbors' territory in quest of important commissions, which legitimately belong to the

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local practitioners, unless upon conditions which shall secure adequate compensation and consideration to all who compete. Those who desire the privilege of selecting among many designers will soon come to understand and accept the terms on which alone they can obtain it.

Very many architects know something of the *Série de Paris*, or schedule of rates for all kinds of building work in that city and suburbs — masonry, carpentry, joinery, painting, roofing, metal-work, and all the other minutiæ of construction, something after the likeness of the English builders' price-books, but having an official sanction and origin. As in England, the quantities of each kind of work in any proposed building are measured from the drawings, either by the architect or by a surveyor, or *vérificateur*, and the amounts being multiplied by the prices of the *Série* give the approximate cost, not only of the building, but of any extras or deductions which may suggest themselves. In making tenders, the contractors simply offer to make such discount, or *rabais*, from the official scale as they think they can afford, and the contract is awarded at six, eight, or nine per cent discount from the *Série*, as the case may be. No architect who has not worked with schedules of quantities and prices can conceive how much time, vexation, and anxiety is saved by their use, and how greatly the measuring of the quantities helps the designer to understand and think out all the parts of his conception. With us at present, not only do the contractors who tender do so with the vaguest notions of what is required of them, but the architect himself is apt to leave important items to future consideration unless some particularly sharp contractor calls his attention to them. In consequence, the bids vary enormously. It is not impossible to find houses, exact counterparts of each other, and built at the same time, of which one cost twice as much as the other; and a variation of a hundred per cent between the highest and the lowest estimates for a building is the rule, rather than the exception, where a number of tenders are made. At present the Paris schedule is undergoing revision. We hope the discussions upon it will penetrate to this side of the ocean, and excite a desire to attempt some similar systematizing of our needlessly difficult business.

Legal items have been quite common in the English architectural journals of late. Two cases where architects were obliged to bring suits to recover payment for their work are reported in the *Builder* last received, and in both of them the architect gained his suit. One of the defendants excused himself for not paying for his plans by saying that the cost exceeded the limit which he had fixed, but the evidence showed that the architect, after examining the ground, had advised his client to build a better house than he proposed, and the latter had approved the suggestion, so that the plans were very naturally drawn with a view to a greater expenditure than was at first intended. In the other case, plans and specifications had been made for alterations to a certain tavern. The cost of the alteration was six hundred dollars, and the architect, who also superintended the work, made the modest charge of thirty dollars, or five per cent. This would seem to be just about the value of the preliminary measurements alone, but the judge thought otherwise. The draughtsman who made the plans testified that with certain interruptions, this work alone, a small part of the whole labor requisite, took him seven days; but his Honor's opinion was that it might have been done in about five hours. Taking into consideration, however, the trouble that the architect had been put to in superintending the work, he ordered judgment for eighteen dollars and costs. Draughtsmen are cheap in England; probably twelve dollars would have covered the draughtsman's wages for the seven days; leaving six for the architect's responsibility, personal interviews with all the parties, time in measuring and superintending, office and family expenses during the time he was occupied on this commission, interest on the cost of his education, the value of his skill, and the greater part of the expense of getting his poor little pittance. Were it not for the judges, it seems as if English professional men might have a chance of getting justice.

Two interesting French cases are reported in the *Moniteur des Architectes*. In the first, two properties were divided by a low party-wall, serving only as a fence. The defendant extended the wall upward, on his side of the centre line, in order to form an enclosure for some new structure. There was no question of the strength of the addition, but its weight being brought wholly on one edge of the old wall below caused this to settle and crack. His neighbor sued to compel him to pull down both the old wall thus injured and the addition, and rebuild so as to bring the weight on the centre of the foundation, as it should be, and the court ordered that this should be done, and that the defendant should pay the whole expense, besides the costs of the suit. Probably the next time he builds upon a party-wall he will employ some one to tell him how to do it properly. In the other case, two houses stood side by side in Paris, divided by a wall which stood wholly on the land of one of the proprietors, the house of the other being simply built up against it. The owner of the wall brought suit to compel his neighbor to buy half of it, thus making it a party-wall. The counsel for the defence argued that if the proprietor of the wall and the land on which it stood chose to pull it down, thus leaving the end of the defendant's house open, the latter would have no right to prevent him, and in that case either party could afterwards build on the party line and recover half the cost from the other, but so long as the defendant was willing to take the risk of the plaintiff's removing the wall, he was free to enjoy its protection and could not be compelled to buy or pay for any part of it, and the court sustained this view and gave a decree accordingly.

The Manhattan Company, which now operates all the elevated railroads in New York, has published its semi-annual statement, containing some interesting information. The total business of the roads gives a profit of a little less than eight per cent on the total amount of capital and bonds. It is well known that the construction was paid for principally from the proceeds of the bonds, the capital being to a large extent nominal, so that this result shows a very large return on the actual outlay. The average fare received was seven and thirty-two one-hundredths cents. The charter of the companies requires them to run at five cents fare for four hours in each day, two hours in the morning and two in the evening, the rate at other times being ten cents, without any reduction for package or season tickets, so that it appears that more than half the passengers are carried at the five-cent fare. The average cost of transportation is four and two one-hundredths cents per passenger. According to the Philadelphia papers, the average cost of transportation on their horse railroads, which certainly do not appear to the stranger to be operated at a lavish expense, is four and twenty-one one-hundredths cents per passenger. Considering the superior speed on the elevated roads, and their exemption from the heavy cost of removing snow in some seasons, this comparison is very favorable to them. It is fair to remember, in estimating the pecuniary results of the business of the New York lines, that two of them have been extended, at enormous cost, far beyond the point to which they can at present be profitably operated, and that the development of the upper portion of the island will add largely to the receipts, without increasing the running expenses.

We have received a letter from a San Francisco architect, courteously calling us to account for our favorable comments on a plan for a five-hundred-dollar cottage published in the *Bulletin* of that city some weeks ago. The writer asks whether it is not lowering the dignity of an architect to publish plans and specifications in a daily paper, inviting the public to call upon the designer, and so on, as if the whole thing were to some extent an advertisement, and complains that the encouragement of such practices renders it difficult to keep up a high standard in the profession. To this we will say that we did not feel called upon to express our opinion of the taste displayed in the presentation of the matter: as we understood it, the design had been bought for publication by the proprietors of the *Bulletin;* a perfectly legitimate transaction; and the disagreeable pushing forward of its author we were quite ready to attribute to the small journalist who prepared the text of the article, such gratuitous puffing being a common habit among that class. All we had to consider was the merits of the plan, which we still think to be ingenious, well-considered, and economical, and the specification, which appears to us intelligent and full. We were the more disposed to praise what we found worthy of commendation because of the neglect with which such problems are treated, in one way by builders, whose ignorance of planning and lack of imagination generally leads them, in such constructions, to a repulsive meanness, and in another way by architects, who, when they touch such work at all, sometimes sacrifice, almost wantonly, the convenience and comfort of the occupants to some unnecessary whim.

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NOTES ON ELEVATORS.—I.

FEW, probably, of those who frequent the hotels and public buildings of our great cities, and ride from story to story in the swift and easy-moving elevators, realize how short is the time since these now indispensable conveniences began to come into anything like general use. Although steam freight-hoists have been known for forty years, it is only about twenty since the first passenger-elevator- or "vertical railway," as it was called, was constructed by the late Otis Tufts for the Fifth Avenue Hotel in New York, and immediately afterward another of the same kind was put into the Continental Hotel in Philadelphia. These machines, which rendered the two hotels famous for years, were very different from any which have since been built. Those who saw them, years ago, for they have long been replaced by more modern contrivances, will recollect that the middle of the car, or "cab," was encumbered with a large vertical cylinder, covered with wooden sheathing. Inside of this cylinder revolved an enormous screw, extending from top to bottom of the shaft, and in the threads of this, which were set at a low pitch, were engaged strong projections from the inside of the cylinder in the cab, so that as the screw was revolved by the engine below, the cab, strung upon it like a nut upon a bolt, moved up or down, slowly, but with absolute safety. This cumbrous and costly apparatus kept the field to itself for some time, until public opinion had so far changed that people, accustomed to the idea of vertical propulsion, were willing to trust their lives to the strength of wire ropes, and suspended elevators being comparatively simple and cheap, their use rapidly spread, until now there are few hotels of any pretension, warehouses or office-buildings, which are unprovided with them, and many are in use in private houses; but the tenacity of wire has its limits, and with rope suspension begins the history of elevator accidents.

With the exception of the obsolete "vertical railway" variety, the essential parts of all elevator shafts and the cars or cabs which traverse them are the same, and it is well to have a clear idea of these before attempting to study the very diverse modes in which the cab is propelled.

The shaft, as commonly constructed in this country, consists simply of holes cut in the floors, one above another, and furnished with two upright timbers to serve as guides for the car. These posts are usually arranged for passenger-elevators in opposite corners of the opening, as this gives opportunity for access to the cab on all sides: for freight-hoists of largest size, it is often better to place them in the middle of the sides. The guide timbers should be perfectly straight and plumb, and of assured strength, for in case of accidents to the suspending ropes, which are always liable to happen, the whole weight of the platform is suddenly thrown upon them by the safety-catches, and any weakness of joints or crookedness in the timber which should prevent the instant and effective action of these, would ensure its destruction. For this reason the splicing which is generally necessary should be sharply looked to, and knotty or cross-grained lumber rejected. Hard pine is very commonly employed, and is perhaps the best wood for the purpose, and the posts, if for instance eight by eight inches in section and too long for single sticks, may with advantage be built up of four by eight inch pieces, breaking joint in the middle of their length, and bolted. This will give a practically solid timber from bottom to top of the shaft, independent of the floors, and is much better than the common construction of short lengths of whole timber, butted together, and kept in line only by the aid of the beams which surround the hatchways. The angles of the posts which look toward the opening are chamfered, and to them are secured iron or hard-wood guides, which are clasped by a notched projection on the bottom of the platform, and direct its motion by keeping it from swaying or twisting. The upper ends of the posts support a pair of cross-beams, which serve to carry the pulleys over which the ropes run. Occasionally, but rarely in this country, iron rolled T-beams take the place of wooden verticals. With us, even in so-called fire-proof buildings, the posts are almost always of pitch-pine, soaked with the grease which is used to lubricate the guide strips. When, in addition, as is here generally the case, the hatchway is enclosed in each story with the thinnest possible structure of varnished boards and glass, or wire-netting, a structure is formed whose dangerous effectiveness in spreading fire from one story of a building to another, the architect cannot too carefully keep in mind. Severe legal penalties should prevent such reckless constructions as are sometimes seen, where inflammable shafts of this kind occupy the well-hole of a staircase, itself of thin boards, oiled and varnished, and sometimes forming the only means of communication between the upper floors of a lofty apartment-house or office-building and the ground. There is usually a strong upward draught in such a shaft, aided often by a ventilating skylight over it, and a flame kindled among oily rags or shavings, or by hot ashes from the boiler which commonly stands near its foot, is immediately drawn into it and assisted by the rubber gas-pipe which hangs in the middle runs with such celerity through the whole height that a wooden staircase in close proximity to it is rendered useless in a few seconds.

Such building is considered criminal abroad, and passenger-elevators are there very differently arranged in this respect. On the Continent, open hatchways are forbidden within the walls of buildings, and such elevator-wells as are placed there are always enclosed from bottom to top by stout brick or stone masonry, with doors at each story. Iron guides are secured to the walling of the shaft, which thus contains nothing inflammable except the cab, and this is itself frequently made of sheet-iron. It is, however, very common to arrange the shaft altogether outside the building, in the court-yard of the large hotels, erecting a light but well-braced open frame of wrought-iron beams and rods, with doors at each story through the outside wall. A little roof protects the pulleys and ropes at the top, and the cab is made tight against the weather. Such an arrangement is hardly practicable in our climate, but it is quite possible, and should be made compulsory, to enclose all such shafts with fire-proof walls.

The apparatus which moves in the shaft consists essentially of a strong platform, suspended by two or more iron rods from the ends of a yoke or beam, which is attached to the rope. In freight-elevators, which carry heavy loads and are subjected to rough handling, the platforms should be of white oak, and bound with iron, besides being strongly braced with iron beneath. For elevators of this kind there is also generally a double yoke, one heavy diagonal beam of iron or wood serving to support two corners, while a lighter one, attached to the first, holds the other two. In certain large hoists the diagonal span would be so great that it is best to carry the beam directly across, so that its suspending rods hold the middle of two sides of the platform, and the corners are secured by iron braces, but this construction interferes with the free use of the platform at the various floors, and is not often adopted in modern machines.

The construction of passenger-cabs is the same, with the addition of a light enclosure of wood-work with panels of glass or wire-netting set up around the edge of the platform, and generally also with skylights and ventilators in the ceiling. Sliding doors occupy one, two, or even three sides of the enclosure, and upholstered seats are fitted in wherever they will be out of the way of the doors. Some of these cabs are gorgeously inlaid and decorated; mirrors are inserted in the small amount of surface available for that purpose, and rich chandeliers hang in the middle. They are to be seen of all sizes, from the tiny box in use in private houses to the spacious rooms, with doors wide enough to allow four men carrying a bed to pass through, which are used for transporting patients to the upper stories of hospitals. It is usual to provide an electric bell, with an annunciator in the car and buttons in each story, to call the elevator from one to another, and the wires for these, as well as the flexible tube for conveying gas to the chandelier, coil and uncoil on top of the structure as it ascends and descends in the shaft. The starting, stopping, and reversing of the motion of the car is effected by means of a "shipper" or shifting rope, consisting generally of a half or three-eighths inch endless wire cord, stretched over pulleys at the top and bottom of the shaft, and so arranged that one side passes through the car. As this moves up and down over it, it is an easy matter to seize the line and by a pull in either direction reverse, stop, slacken or quicken the movement at pleasure. To facilitate the grasping of the cord, iron handles are often slipped over it, and adjusted by set-screws so that one will be found in a convenient position as the car nears each story. Some builders use a still neater arrangement, by which the rope is entirely out of sight, the only visible apparatus for controlling the motion of the elevator consisting in a wheel some twelve or fourteen inches in diameter, at one side of the car, with a thick round rim suitable for holding in the hand. Around a pulley attached to the shaft of this, a loop of the shipper is taken so that it revolves as the platform moves up or down, and a turn of this in either direction acts upon the shipper in the same way as a direct pull.

To prevent any possible negligence on the part of the attendant from allowing the platform to be drawn up against the top of the shaft, a sleeve is fixed upon the shipper rope near its upper end, larger than the opening in the ceiling of the car, so that when this is lifted to that point a further rise pulls on the shipper by means of the cab itself, and stops the engine. In the same way a similar sleeve at the lower end prevents the platform from descending below a given point.

It is usual in passenger-elevators to fit latches both to the cab doors and the corresponding doors of the enclosure, opening only from the inside, one of the doors to the shaft being fitted also with a lock which can be opened from the outside. In this way access to the shaft or car is made impossible for any person except the attendant in charge. In some cases, especially in apartment-houses, it is considered better to run the risk of accident than incur the expense of a regular attendant, and the doors are made to open from the outside. In order to be able to control from the different floors the movement of the car in the shaft, the outer side of the endless shipper rope is made to pass within reach, and of course a pull at any part of this will reverse, start, or stop the engine in the same way that it is controlled from the cab. The French have a simple arrangement of handles at the different stories, which act upon corresponding projections in the shifting rope, so that the platform may be called in either direction and stopped exactly at a given story, by pulling out or pushing in the appropriate handles either in the car or outside.

Whatever the arrangement, the shipper rope should be carefully watched, and renewed as soon as it begins to show signs of fraying or weakness, for the breaking of this cord very often occasions serious accidents by allowing the platform to be drawn up so forcibly against the top of the shaft as to break the main ropes, when, of course, it falls to the bottom unless caught by the safety appliances, which many elevators do not possess, and whose action is always uncertain. In order to avoid the continual bending around small pulleys

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which is inevitably fatal in time to wire ropes, short chains are sometimes inserted at the upper and lower end of the shipper. As the movement of this is limited — a pull of eighteen inches or so in either direction being as much as is ever necessary — all the bending around the pulleys then comes upon these chains, the ropes between being always straight. For freight-elevators the whole length of the shipper is often made of chain.

So far, the visible features of all modern elevators are the same, however the car or platform is propelled. In all, the endless shipper rope is the means for controlling the movement, although it exerts its power by various modes, and the general appearance of shaft and cab are alike everywhere. But in the manner of applying power to the hoisting of the platform there is almost infinite variety, and upon the variations in the modes of propulsion depend the different forms of safety apparatus, whose action it is important to understand clearly. Most of the safety appliances are adapted only to rope-suspended apparatus, and indeed they are hardly necessary in any other kind, so that it will be well to study their various forms before describing the still more various ways in which suspended elevators are driven, but it is perhaps judicious to glance first at the small number of machines which dispense wholly with ropes, and afterwards consider the rest of the subject by itself.

Among the modern elevators which secure safety by avoiding the use of ropes or chains, the most ingenious, and in many respects the best, is one made by Messrs. William Miller & Co. of Cincinnati. In this the screw principle, on which the early "vertical railways" depended, is employed, but in a much more convenient manner. Instead of an immense threaded shaft extending the whole height of

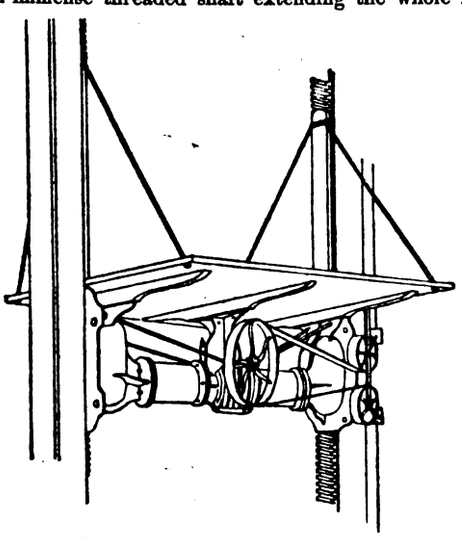

Fig. I. Miller's Safety Screw Elevator.

the building, through the middle of the platform, two notched strips of iron, moulded so as to form slices of a long hollow screw, are secured to the guide posts, the castings being fitted end to end so as to make the succession continuous to the top of the lift. Under the platform are placed two short vertical screws, whose threads engage in those of the side strips, and as these are turned around with equal velocity the platform rises and falls steadily and securely, for even the total destruction of the endless screw on one side would only tilt the platform, which could not fall until both had given way, and the breaking of the belt or shipper rope would simply leave the load stationary.

Motion is communicated to the short screws beneath the platform by means of a long endless belt, reaching from top to bottom of the shaft, from which a loop is taken out at one side and carried over a pulley under the middle of the platform. From this pulley the power is transmitted to the screws by a very simple system of bevel-wheels, and as the elevator moves up and down the loop travels with it.

As the belts for a lofty shaft are very long, ropes are sometimes used instead, and an arrangement for tightening the rope or belt from time to time is applied; but, in general, elevators of this kind work best where the load is not lifted through a great distance, and strength rather than speed is desired.

THE VENTILATING FIRE-PLACE.[1] — II.

In the chimney of the fire-place in question only two distributors were required. These appear to have no injurious effect whatever upon the draught, although flat dampers are used in them instead of the cone-shaped ones recommended and shown in the drawings.

The fresh warm air having entered the room as described, at the ceiling, descends as it cools, and gives place to that which follows, until it reaches the fireplace-opening below, through which it finally escapes. In this way, for every-day use, the draught of the fire-place is supplied entirely with fresh air previously warmed against the smoke-flue, and the amount of air changed is, on these occasions, dependent upon the size of the smoke-flue, the inlet registers being as large as desired. For special occasions, however, when the room is full, and a much greater change of air is needed, the ventilators are caused to act in a manner quite different. The cold-air supply register at the back of the fire-place is closed. The damper at the top of the fresh-air chamber (Fig. 184, top) is opened, and the warm-air supply register at the top of the room becomes a foul-air exhaust flue to assist the fire-place smoke-flue in carrying off the extra quantity of heat and foul air generated by the gas-lights and guests, to the corresponding chambers above. Thence it enters a large exhaust-flue provided for it at the top of the house and is removed. Fig. 187 shows the chimney-stack with this exhaust-flue at the top. This system may be adopted always in summer.

Where the rooms above are, as is customary, used for cloak-rooms or dressing-rooms during an entertainment, the open fire-places in them may be made to assist in the ventilation of the occupied room below as follows: The registers in the chimney-breasts at the tops of these rooms are left open. That part of the foul air which does not escape through the damper at the top of the air-chamber containing the distributor, enters the room through these registers, and is carried off through the open fire-places, just as does the fresh air in the room below. At the close of the entertainment these rooms may be thoroughly aired by opening the windows. Such use of the upper rooms is, of course, not to be recommended; but where for the sake of economy the exhaust-flue at the top of the house is omitted, recourse may be had to this method. The removal of the foul air being thus provided for, the fresh air is supplied on festal occasions as follows: Open fires on these occasions in the occupied rooms are not often used. Their heat would be too unevenly distributed, and would prove insupportable to those nearest them. Moreover but a comparatively small amount of artificial heat is required. Each guest is an open fire-place to the rest, generating about as much heat as an ordinary candle. Each gas-burner forms another open fire, and radiates its heat in every direction. All that is necessary is to take the chill off of the large volume of fresh air introduced, so that, with ample ventilation, no unpleasant draughts are felt. For this purpose a small furnace, with a very large fresh-air box, is placed in the basement. It stands in this case under the parlor, and the fresh air is taken directly from the open vestibule through large cut brass registers, similar to that already described for the open fire-place. Thin cut brass is used in preference to the ordinary enamelled iron, because it does not show the dust as this does. A volume of air as large as is required and slightly warmed is thus distributed over the ground floor occupied by the guests. The doors of the entertainment rooms are usually left open so that if desired the supply of fresh air comes from the entire house (excepting those rooms which receive and serve as passages for the foul air and are therefore closed off), instead of from a single register, though the latter should be large enough to do the work for each room alone. Should then the weather be moderate, the windows in the upper stories may be opened wide or, if it be cold, partially opened, and the general temperature of the house lowered as the heat below increases, or regulated at pleasure. No window in the entertainment-rooms need ever be raised as is now customary generally at supper-time, much to the annoyance and distress of many of the guests.

What now is the motive power, which, when the fire-place is not in use, produces in the exhaust-flues a draught of the required velocity — powerful, reliable, steady and yet easily controlled?

At one end of the house this motive power is furnished by the furnace smoke-flue when a furnace is used, or by a gas-jet in the air-chamber when it is not; at the other end, by the range smoke-flue, which, if desirable, may be aided by a gas-jet in the fresh-air chamber.

In Figs. 184 and 187, the sheet-iron furnace-flue will be seen at the right of the distributor. The iron is one millimeter thick and extends up to the ceiling of the third story. The flue at this point becomes an ordinary eight-inch by twelve-inch (20 by 30 cm.) brick flue. The parlor fire-place flue and distributors are also constructed of heavy sheet-iron pipe 1 mm. thick and 25 cm. (10 inches) in diameter, but the iron ascends only to the ceiling of the third story, where, like the furnace-flue, it enters a brick flue (in this case 30 cm. square).

No iron flue should ever run to the top of a chimney, for two reasons; first, because of the condensation of the water of combustion, which requires an absorbent material, like brickwork, to take it up before it falls back into the pipe to rust it and make a disagreeable dripping sound; and, second, because of the unnecessary expense of so doing.

This iron furnace-flue, coming in close contact with the fire-place flue, heats it to such an extent that a powerful ventilating draught is maintained in the latter at all times. The furnace-flue also heats the air in the fresh-air chamber, and produces another powerful ventilating draught through the upper register. The velocity at this point may also be increased almost without limit by a lighted gas-jet placed just under the damper opening from the top of the air-chamber into the space above (Fig. 184, top, gas-jet represented by asterisk). This gas is lighted and extinguished in the writer's house by electrical apparatus, — the safest, most economical and most convenient method; but where electricity is not used, the gas may be lighted with a match or gas-torch, through the brass register at the top of the room.

These two openings then — the register above and the fire-place smoke-flue below — are capable, combined, of carrying off the foul air of the parlor at the rate of sixty or seventy cubic meters a

[1] This paper, by the writer of the Open Fire-Place articles, will be incorporated with them in their separate form.

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minute, without inconvenience to a single guest. By enlarging the registers, and flues, any desired increase of ventilation might have been provided for at but slightly increased cost. Experiments made in the same air-chamber and under similar conditions on two distributors of the same size, one made of terra-cotta and one of iron, showed the yield of heat per hour to be considerably greater for the iron than for the terra-cotta. Nevertheless, the latter raised the air to as high a temperature as was desirable, and, in consideration of its greater durability, may in some cases be preferred to the latter. It is particularly to be recommended in the lower story, when other distributors are used in the same smoke-flue in the stories above. If terra-cotta be used on the first story, iron should be used on the second, and, if the first cost were not too great, copper would be the best material for the third, as being the best heat-conductor, and therefore best able to draw from the smoke the remainder of its heat. Copper also is better able to stand moisture than iron, but is sooner destroyed by great heat. All things considered, stout sheet-iron is much the best material for our purpose, since our object is generally to extract from the smoke the maximum amount of heat at the least cost and in the smallest space. The cost of manufacture in terra-cotta is greater than in iron when the number required is small, but less when it is large.

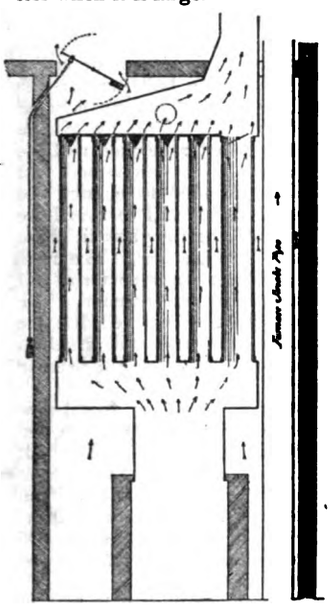

Fig. 188.

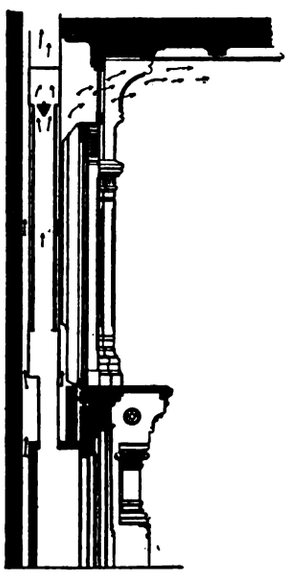

Fig. 189.

The form of the iron distributor is seen in Figs. 188 and 189. The connecting-pipes are all perpendicular. Five of these pipes are 15 cm. (six inches) in diameter, and stand 10 cm. (four inches) apart from each other; a sixth is 25 cm. in diameter. But all the upright pipes might be as large as the largest (increasing the dampers in proportion), and the heating surface would be so much greater. It is found most economical to make the upper and lower horizontal pipes rectangular in section and the connecting-pipes circular. Round pipes are cheaper than square, but the upper and lower pipes are made square to simplify the connection and facilitate the riveting. The perpendicular pipes require no clean-out holes when iron is used, because a smart rap on the pipe is sufficient to cause the caked soot to fall to the bottom. The upper horizontal pipe has a round clean-out hole in the centre of the accessible side. The hole is covered with an ordinary tight-fitting sheet-iron cover.

When these distributors are used in a smoke-flue, their size of course depends upon the amount of available space behind the chimney-breast. In general, no increase in the size of the breast beyond what is customary is necessary. In the lower stories where fire-places are most used, and where the distributor is most desirable, only a single smoke-flue is usually to be found behind the chimney-breast in addition to that of the fire-place in question, namely, the furnace-flue at one end of the house and the range-flue at the other. Nevertheless, on these stories chimney-breasts are usually boxed out to a width of two or more meters to give them an agreeable proportion, and to allow room for the mantel-piece and shelf, so that a space of one or two meters in width is generally utterly wasted. The distributor is built to just occupy this waste space; though if more room is desired, its width can usually be increased without injury to the appearance of the room. The projection of the breast into the room is not increased over what is customary. In order to permit of ready access to, or of complete removal of, the distributor at any time without injury to the surroundings or to itself, an opening is left in the front or side of the chimney-breast sufficiently large to allow of its removal and replacement in a single piece; the masonry above being supported by a brick arch, corbel, iron beam (as shown in Fig. 189), or by a heavy piece of flagging which may serve at the same time for the hearth of the fire-place above. The use of the flagging has the advantage of doing away with the need of the trimmer-arch and its header, and of leaving room for the safe passage of the ventilating pipe of the gas-chandeliers, the thickness of the flagging requiring seldom to be as great as the depth of the joists. The joists, usually morticed into the header, may be hung with irons to the outer edge of the flagging, which may be strengthened if desired, where the span is great, by an iron beam. In consideration of this advantage of allowing safe passage for gas-ventilators, and of dispensing with the brick trimmer-arch, and of the saving of tiles, face-brick, or marble, where the smoothed surface of the flagging is allowed to serve as the hearth for the fire-place above, the use of flagging does not necessarily add to the expense of the building, provided the plans are carefully and understandingly drawn before the work is begun. These openings in the masonry of the chimney-breast are then covered by hinged panels, which may be made as ornamental as circumstances and the skill of the architect will allow. The backs of the panels should, of course, be tinned, with proper air-space behind the tinning to avoid injury from heat radiation. With these precautions this arrangement of the smoke-flue renders it as much safer than the ordinary flue, as a double flue is safer than a single one, and justifies lowering the rates of insurance on houses containing them. When the side instead of the front of the chimney-breast contains the door, its decoration becomes, of course, comparatively unimportant, merely a moulding being required to cover the joints of the hinged panel. But openings of the requisite size are rarely practicable at the side, for the reason that the projection of the chimney-breast is insufficient, the flues usually retreating into the main wall.

Instead of the conical dampers shown in Fig. 188, when the draught is good, a simple sheet of iron of nearly the length and width of the horizontal pipe and containing a series of holes cut in it corresponding to the flues below, may be placed over the openings of the upright pipes to regulate the passage of the smoke. The position of the damper over the perpendicular flues regulates the amount of opening in each.

UNREST.[1] — II.

Now, the point I beg to submit to you this evening is, that it is to this despised and neglected "frame-making on a large scale," that we ought mainly to address ourselves, — to cultivate with assiduous care and make our peculiar study, as in that direction lies our special source of strength; that Mr. Ruskin's first idea was the right one, and that the sculpture and floral mouldings are in fact, and should be in design, subordinate to and not the masters of the architecture; that they may be, and often are, omitted altogether without detriment, and that when they become objects of absorbing interest they tend to rob our work of all its breadth, and nearly all its value. To put the main theory which I am combating to a practical test, let us apply it to those glorious Cistercian abbeys whose ruins adorn our land. The rule of their founders, as you know, forbade the introduction of ornament; and all that carving and illusive imagery which Mr. Ruskin says is the "all in all" was conspicuous by its absence, nor were those precious marbles used which he says are the only allowable substitute. Yet successive generations have borne testimony to the beauty and impressiveness of those exquisite works. It is idle to dispute about mere words — whether this be architecture, as we understand it, or "frame-making." It is the quality which we all should desire to emulate. What is it that impresses us on entering the nave of Canterbury or Durham or Chichester or Southwell Minster? Not the cushioned capitals more or less rude or ornate, nor the ruder attempts at surface ornament in the tympana of the triforium arches. Before we have time to peer into these, be they never so lovely, the power and majesty of the whole work falls upon us like a spell and awes us into reverence. Something, no doubt, is due to mere age — something to religion and historical associations. We are, nevertheless, by no means regardless of its general size and form. The "frame-making on a large scale" has done its work as nothing in the world beside could have done it, and the human mind is more amenable to its divine silences than to the eloquence of all the carving in the world. But we have now-a-days, as the early teachers had not, other teachers — multitudes of channels in which the stream of learning flows — endless appeals to our intellect and to our heart. But amongst all the resources for the elevation of the human mind, and amongst all the appeals to our imagination, there is still none so potent and so sure as that afforded by grand and noble architecture. To this grandeur and nobility I submit that mere excellence of detail contributes only in a secondary manner, and that in restricting our attention to it we run in danger of missing ends of immeasurably greater importance. May I adduce, in illustration of my general position, a "modern instance" which combines great wealth of detail with masterly grouping and general arrangement, and endeavor to assess the part played by each element in the general result? I refer, as you may guess, to the Houses of Parliament. I have always admired that building, and still think that, in spite of the hostile criticism with which it has been assailed, the new Palace at Westminster is, on the whole, the most satisfactory secular building which the Gothic revival produced. Yet one can never pass it without wishing that its great architect had left us some spaces of repose on its enriched fronts — some quiet pauses in the restless pageantry of its façades. Who, for instance, would not wish away from the clock-tower all that gilding and frippery which vulgarize its summit, reduce its apparent height,

[1] From a paper read at a meeting of the Architectural Association on April 23, by Mr. E. Ingress Bell.

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and compromise its dignity by destroying its simplicity? Would not the whole structure benefit by the removal of half the cresting and brattishing, the wearisome iteration of panelled surface, and the multitude of small prettinesses which crowd every part of it from base to summit? As a consequence, we never quite know whether we like it or not. We discuss it, and argue about it, and hesitate to express a definite opinion. There is statuary, and there are floral mouldings enough in all conscience; but of these it cannot be said that we are "intensely observant." Without reviving a buried controversy, one may safely say, that if the hand of Pugin appears at all in the work it is in the details, and that, as a composition, it bears unmistakably marks of the genius of Barry. The value of the details diminishes every day, and we pass them by as a matter of course. The pretty parts of the building are, moreover, perishable parts, and already the crockets and finials are dropping away in decay; the vanes are dangling in shreds about the pinnacles, but the artistic skill evident in the general arrangement of building, as a whole, forms an element of permanent value, and as long as the river flows will appeal to the imagination with a force which the fluctuating fashions of the day cannot disturb or diminish. We do regard its general form and size, and herein lies its real power. We are charmed, in spite of the interstices, by its varied sky-line, by its "Crown of Towers," by the play of light and shade — the heightened *chiaroscuro* which the opacity of a London atmosphere imparts to a building so picturesquely varied in outline and mass, and of such considerable extent.

I may perhaps be excused for bringing to your remembrance certain broad principles of art laid down by Sir Joshua Reynolds in his excellent discourses, which are too often overlooked by architects of the present day. You are doubtless familiar with them, and will anticipate what I am going to say. Yet, at the risk of wearying you, I cannot refrain from referring especially to the advice contained in his eleventh discourse. It is dangerous, I know, to apply the dicta of one branch of art to another, yet in this case the analogy between the "finish" to which he refers, and the "details" in the sense in which I have used the word is complete, and his warnings and advice will, I submit, apply with undiminished force. "The highest finishing," he says, "is but labor in vain, unless at the same time there be preserved a breadth of light and shadow." This is from the Notes on the Art of Painting. Again, "I have observed that an excessive labor in the detail has nine times in ten been pernicious to the general effect, even when it has been the labor of great masters." And again, "It is in vain to finish ever so minutely the parts, if the *masses* are not observed, or the whole is not well put together." The same formula variously expressed runs through all his work; and the lesson which he is never weary of enforcing is that you must design or compose on broad lines to achieve satisfactory results; that you must work down from large to small, and must not be distracted from your main purpose by undue solicitude about subordinate parts.

I believe that our habit of working in pen and ink, with the point rather than with the brush, has much to answer for, and that the sooner we abandon or modify the practice the better. The details, the finish of our works, are more likely to engage our attention in the former case, while broader considerations are likely to be a concomitant of the latter method. In any case we should keep well before us the advice of Sir Joshua Reynolds, and the examples of the successful works of our ancestors. I know, of course, how easy it is to prescribe and how difficult it is to achieve. It is something, however, towards arriving at the goal if we feel sure that we are on the right road: such a road I think is to be found in the considerations I have ventured to urge upon your attention. In conclusion, I am happy in being able to quote a stray passage from the most distinguished art-critic and brilliant writer of the day. You will recognize the incomparable style, and you will, I hope, indorse the sentiment embodied. "While it is not to be supposed," he says, "that mere size will ennoble a *mean* design, yet every increase of magnitude will bestow upon it a certain degree of nobleness. So that it is well to determine at first whether the building is to be markedly beautiful or markedly sublime, and if the latter, not to be withheld by respect for smaller parts from reaching largeness of scale. Let the architect who has not large resources (and I should be tempted to add also, let him who has) choose his point of attack, and if he choose size let him abandon decoration, for unless they are concentrated, and numerous enough to make their concentration conspicuous, all his ornaments together will not be worth one large stone. And the choice must be a decided one and without compromise. It must be no question whether his capitals would not look better with a little carving — let him leave them huge blocks: or whether his arches should not have richer architraves — let him throw them a foot higher. A yard more across the nave will be worth more than a tessellated pavement, and another fathom of outer wall than an army of pinnacles."

THE ILLUSTRATIONS.

HALL FOR THE REPUBLICAN CONVENTION AT CHICAGO, ILL. MR. W. W. BOYINGTON, ARCHITECT, CHICAGO, ILL.

For a description of this building, see the letter of our Chicago correspondent in the next column.

COMPETITIVE DESIGN FOR THE Y. M. C. A. BUILDING, LYNN, MASS. MR. J. H. WETHERELL, ARCHITECT, BOSTON, MASS.

BUILDING ON THE ESTATE OF PIERRE LORILLARD, ESQ., NEWPORT, R. I. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

The perspective view of the main house and some of its interior details were published in the *American Architect* for July 6, 1878.

CORRESPONDENCE.

THE NEW AMPHITHEATRE FOR THE REPUBLICAN NATIONAL CONVENTION.

CHICAGO.

When the National Republican Committee met at Washington in February last to determine upon the time and place for holding the National Convention of 1880, a voluntary committee of citizens of Chicago guaranteed to build a hall free of expense to the National Committee and capable of seating ten thousand people, provided the Convention should be held in this city. The offer was accepted, and June 2 was the time appointed for the meeting. Accompanying this liberal offer was a sketch made by Mr. Wm. W. Boyington of this city, showing how a part of the Exposition Building, in which our annual industrial exhibitions are held, could be used. Mr. Boyington was also the architect of the building, which was built in 1873.

After Chicago was selected, Mr. Boyington, the architect, made the carefully designed plan which has been carried out. The money required was subscribed by the railroad companies entering the city, the leading hotels, and prominent merchants, without regard to party predilections. But in order to prepare the building for this work as well as for its other uses, the Exposition Company decided to make extensive alterations and improvements. Many of the floor timbers had decayed, the floor itself needed renewing, and the heads of the piles on which the Howe arched trusses rested had many of them also decayed. It was also decided to change the form of the main roof, to remove the flat skylights and to substitute vertical lantern windows. The aggregate area of the glass in these additional windows is over twenty thousand square feet. The roof, which was formerly an arc of a circle, was given an ogee form, and the alteration was made in a novel and economical manner. The roof boards above the old skylight line were not removed, but the rafters supporting them were cut loose from the trusses and lifted up by main strength. The natural curve of the boards and tin became the permanent curve of the roof.

All the piles on which the trusses rest were cut off six feet below the level of the ground. They were then exposed six feet lower and surrounded by concrete six feet in depth. Then a stone pier was built from the tops of the piles to the ends of the trusses. The trusses have a span of 150 feet, and all of them had to be shored up. The main building is 800 feet long and 200 feet wide. The art-gallery, conservatory, and agricultural machinery annexes make it cover 300 by 1,200 feet. The alterations and renovations of the building cost the company $30,000 and required six weeks to carry out.

The amphitheatre for the Convention occupies the south half of the main hall. The portion used by the Convention for meeting, telegraphing, ante-rooms, etc., is 200 by 400 feet. The amphitheatre occupies the whole of the space between the roof trusses, which rest on the ground, and is 150 feet wide and 375 feet long without a column or obstruction of any kind. The south end behind the stage is a semicircle. The north end is a half octagon. The lowest point for seats is that occupied by delegates on the original floor level. The highest point is at the sills of the new lantern windows, which surround the hall on all sides except the north. Over the hall are one full dome and one half dome. The dome over the stage is cut off by immense sheets of blue bunting with white stars, from which extends along the top of the room an immense piece of red and white bunting to the west end, and thence down to the top row of seats. It forms a sort of decorative American flag 300 feet long. The stage consists of two parts. In the centre is the rostrum for officers; surrounding it, raised one foot higher and separated from it by a low railing, is the stage for distinguished invited guests. In front of the officers' stage and a little lower down in a sort of orchestra is the place for ninety-two short-hand reporters. On each side of the reporters' stage are the main entrances to the stage and delegates' section which pass in front of the three telegraph offices. The Western Union Telegraph has forty wires entering the building and one hundred and sixty instruments. The American Union Telegraph Company has twenty-two wires, and the Atlantic and Pacific a smaller number. The operating rooms are under the rising banks of seats on each side of the stage. The delegates occupy 756 seats immediately in front of the reporters; behind them are 756 seats for alternates, and behind the alternates are 702 more seats on the main floor for the public. These are all on the main floor, which rises on a rapid slope from in front of the reporters' stage. The rising bank of seats surrounds the entire floor and stage on all sides. The semicircle behind the stage is reserved for ladies, and on the right are 477 seats for members of the press other than short-hand writers.

The seating capacity of the house is as follows: —

Stage	550
Short-hand reporters	92
Main floor, Delegates	756
" Alternates	756
" Section A	702
Ladies' gallery, section B & Q	1,585
Press gallery " P	477
Band gallery "	44
Galleries C, D, E, F, G, H, I, J, K, L, M, N, O	4,914
Total seats	9,876

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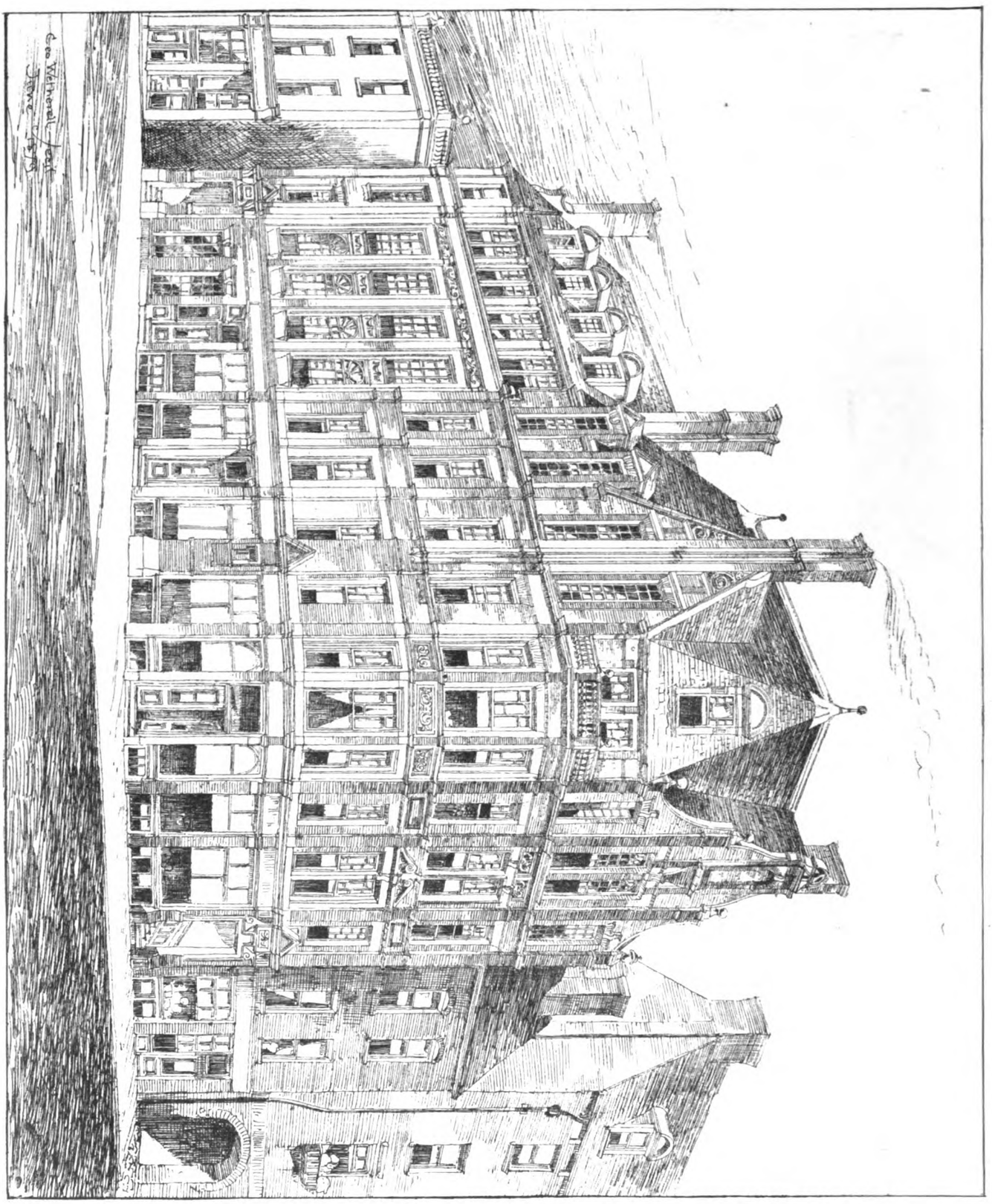

SKETCH DESIGN FOR Y. M. C. ASSOCIATION AT LYNN.

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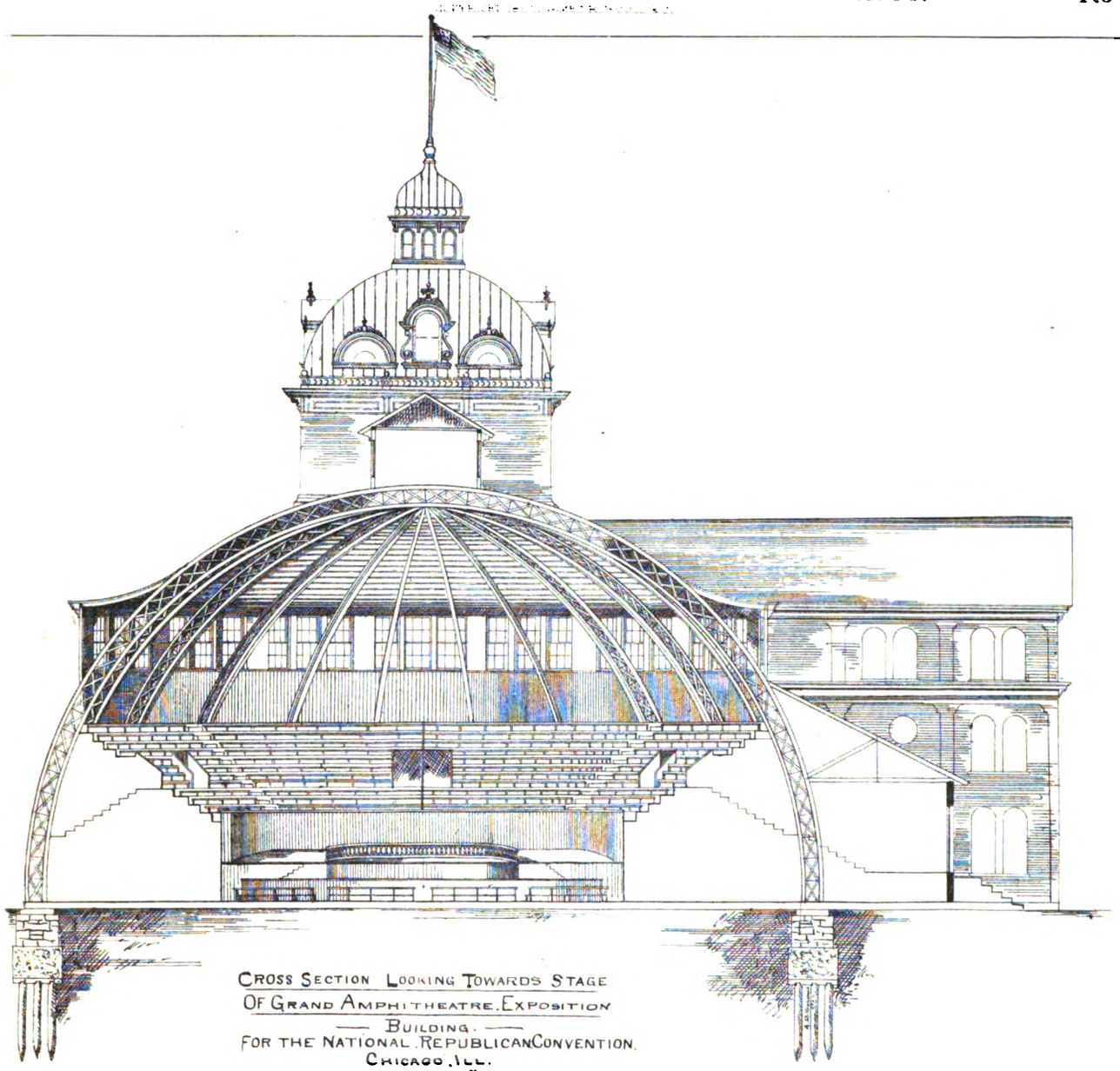
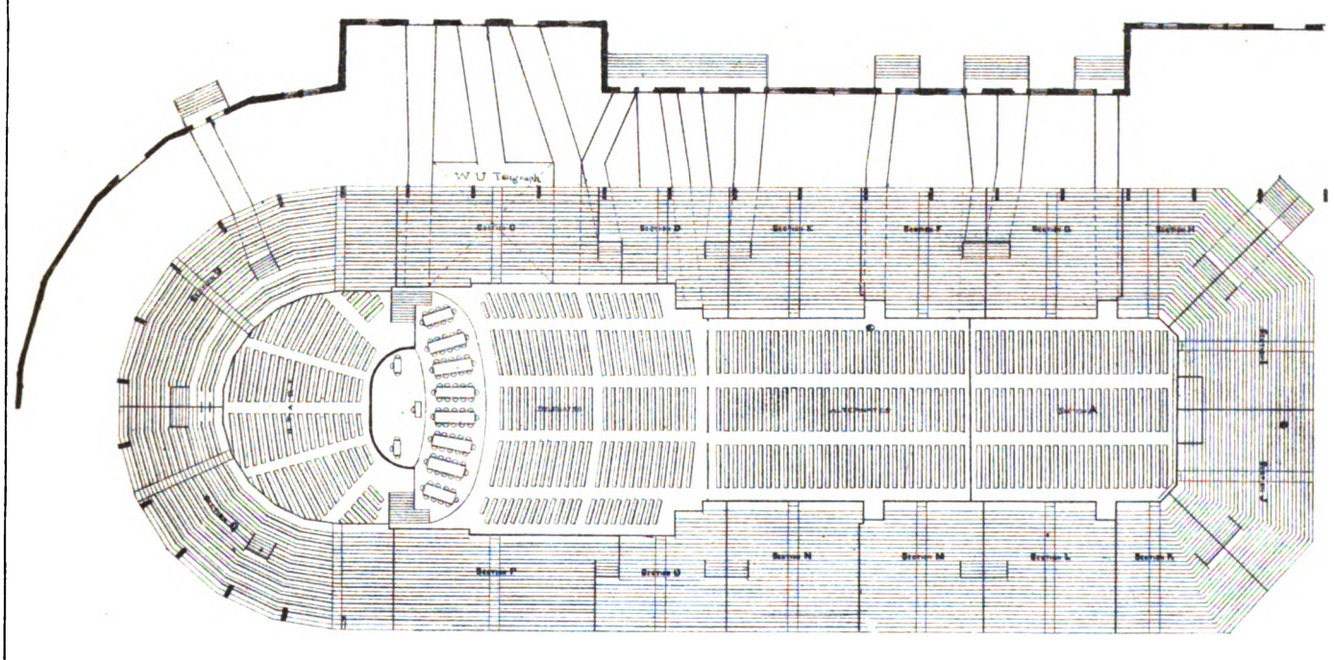


CROSS SECTION LOOKING TOWARDS STAGE
OF GRAND AMPHITHEATRE. EXPOSITION
— BUILDING. —
FOR THE NATIONAL REPUBLICAN CONVENTION.
CHICAGO, ILL.
W. W. Boyington Architect.
Chicago Ill



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The Convention Amphitheatre is entirely constructed within the Exposition Building — that is to say, there is nothing visible of the original building from within, except the lantern windows and the arched roof. This immense room is unimpeded with columns, and has no overhanging galleries. Notwithstanding its great length every seat has an unobstructed view of the stage. Your correspondent had an opportunity to test its acoustic properties a week ago. It was found that a voice could be heard the entire length, with but slight elevation above a conversational tone. It was tested from many points with satisfactory results. The value of only a low and curved background not more than seven feet high was practically demonstrated. There are several points in the hall from which this could be illustrated. The effect will doubtless be much better when it is filled with people.

The Citizens' Committee procured the use of the Exposition Building free of rent. It has constructed this immense hall for the remarkably reasonable sum of $7,000. The work was done by contract with the stipulation that the lumber is to be returned to the contractor. Immediately after the convention it will be taken down, and become a thing of the past. There are some ingenious features about it; one is, that where the seats have no backs and are arranged in what might be called circus fashion, the treads are divided into two parts by a strip of two-by-four lumber nailed in the centre of each. Between this and the riser are two inches of sawdust. This serves the double purpose of deadening the sound of feet and furnishing a continuous cuspidore in front of every seat. Where the seats have backs, and in the aisles, the entire floor is covered with two inches of sawdust. Every seat in the house is numbered, and all the tickets will be coupon tickets, entitling every one to a reserved seat. Every lettered section has a separate entrance from the outside, and no one can pass from one section to another except on the ground-floor and the stage. There is an abundance of committee-rooms, and a restaurant is in the building. There is a conservatory where exhausted orators may lounge and recuperate, and a counter where they may moisten their parched throats.

All this has been accomplished within six weeks from the 15th of April. The building was formally accepted by the sub-committee of the National Committee on the 26th of May. Of the decorations it is hardly necessary to say anything except that they consist mainly of arrangements of national flags and bunting, about five hundred flags having been used. There are twenty-six exits and entrances averaging six feet each, or having a total width of one hundred and fifty-six feet. As for the construction of the building your readers can judge best from the illustrations sent to you.

What is most remarkable of all things in relation to this structure is the fact that so many of the conditions of a perfect auditorium and hall for public gatherings have been fulfilled in a building to stand for one week only, and larger perhaps than any similar building heretofore erected, while so many buildings of a permanent character are going up every day where these essential conditions are neglected and forgotten. But the reason for this is evident, when we see that the whole scheme is the result of an intelligent plan conceived and carried out under the eye of its author, untrammelled by a would-be superior authority. The credit and the responsibility rest mainly upon the shoulders of the architect.

NOTCHING JOISTS BY GAS-FITTERS.

MR. ALEXANDER BLACK, an architect, of Keokuk, Iowa, writes as follows to the *Metal Worker*: —

"As the *Metal Worker* is read by many gas-fitters, I wish to use its columns to disseminate among them a needed warning against the very pernicious and wide-spread practice of notching joists on their upper edge through the middle of floors, in order to make short cuts for laying pipes to drop-lights. This custom is very common, especially in the West. In my own practice I have had immunity from this vexation for several years, as the established gas-fitters in this vicinity know I will not permit notching at a greater distance than two feet from bearings. This week, however, I encountered the same old annoyance. A new man had been put to work in a building under my charge, without my knowledge, and before my daily visit, had notched down 1½ inches into all the joists across the middle of the floor. On being questioned if he was aware of the injury he had done, he replied that such a small notch could not weaken the joists much, and that he and all other gas-fitters with whom he was acquainted had always notched across the middle of floors to reach drop lights. He could not realize it when I explained that the 1½ inch had not only reduced the effective vertical depth of 12-inch joists to 10½-inch — or, in other words, had diminished their vertical depth one ninth part — but that their stiffness or strength to resist bending or sagging was really reduced one third part; that is, the notched joists only retained two-thirds of the stiffness they possessed before being notched in the middle of the span. Of course such a large decrease of strength could not be permitted, and must be restored by the simplest means. Accordingly, as the top part of the joists is in compression, I directed that the notches be carefully filled with hard wood, tightly wedged, and I presume that the contractor will allow the gas-fitter to reap the benefit of the lesson he made for himself.

"It is essential that gas-fitters — indeed all building mechanics — should know that the stiffness or resistance to sagging within an elastic limit varies directly as the cube of the vertical effective depth, the length and breadth of the beams of the same materials being alike in the different pieces compared. That is, if one joist be two or three times as deep as the other, the breadth and span being alike, it will be 8 or 27 times (cubes of 2 and 3) as stiff as the other. In the instance cited above, the cube of the depth, 12 inches, is 1,728, and the cube of 10½ inches, the effective depth to which the 1½-inch notch in the middle reduced the 12-inch joist, is 1,157.625; substracting this latter figure from the former, we find the reduction equal to 570.375, which in even figures is one-third of 1,728 — the sum representing the original. By elastic limit in the above description is meant that condition of beams when their deflections begin to increase more rapidly than their loading increases for each equal addition to the load. The beam or joist may be considered as beginning to break when this limit is reached.

"The stiffness which is the essential condition of floor-joists must not be confounded with their ultimate strength or resistance to breaking; the extent to which sagging or bending of floors may be permitted without being prominently noticeable or causing plaster ceilings to crack, is one-fortieth of an inch per foot of span. Joists usually are made crowning to this extent, in order to compensate for sagging. I may note that the ultimate strength of beams of same materials and of like length and breadth, but of different vertical depths, varies directly as the squares of their effective depths."

VENTILATION OF SEWERS.[1] — I.

ALTHOUGH the sewage should not be allowed to remain long enough within the sewers to undergo much decomposition, yet much of the sewage is, when admitted, partly decomposed, and as more or less of its impurities continually adhere to the walls of the sewers from day to day, it is important that the gases evolved from such decomposition should be removed. In fact, without efficient ventilation the sewers very soon become public nuisances rather than benefits. They are in that case the active and efficient agents for the rapid diffusion of disease, from house to house, from street to street, and from quarter to quarter of a great city. In using the sewers for the removal of liquid refuse we have had the help of the force of gravity; but in dealing with these gaseous products this force turns against us, and works the other way, impelling the noxious gas upwards towards the branches and inlets whence the sewage came, or up any lateral street sewer the course of which lies in a convenient direction. If ample means are not provided for replacing these gases by fresh air, the process goes on and accumulates them in large volume, and these gases, impelled by the well-known forces of diffusion and gravity, seek and actually obtain entrance to every house with which the sewer has connection. Very few of our houses have traps outside their walls in their main-drains, and even where they have, this gas has the power of passing slowly through the trap water by absorption, to be given off again on the other side, whenever it accumulates to such an extent as to largely replace the common air in the sewer or drain. The insidious nature of such an enemy is one of its worst characteristics, for it acts by invisible agencies. The worst of these gases can hardly be detected by the sense of smell, the only sense with which we are endowed having any semblance of the function of the watch-dog in guarding us against such attacks. Individual action on the part of the house-holder is quite powerless against this evil. No system of traps, even if employing all the patents now on record, would suffice to stop it. Neither is the perfect ventilation of the house-drain itself, however important, able to cope with the lack of ventilation in the sewer. The office of house-drain ventilators is local only, and can never relieve to any appreciable extent, the want of ample change of air in the sewers themselves, even if it were safe to adopt such a course. Some cities have attempted to remedy the trouble by connecting the rain-water spouts of the houses directly with the sewers, so these pipes could act as sewer-vents, and I have myself at a former time vindicated such a practice under certain limitations. But this remedy is plainly inadequate to the duty assigned, besides endangering the houses themselves. Its inadequacy is seen when we consider that the gases from the sewer are most apt to invade houses during a heavy rain. The volume of rain-water entering the sewer at such times is often very large in this climate, where two inches of rain have been known to fall in a single hour in a summer shower. The influx of this large volume of water must of course displace an equal bulk of gas, for it cannot absorb or dissolve it without a good deal of time, and then only to a limited extent. Other parts of the sewer, down below the hills, are often at such times running full, perhaps more than full, and running under a pressure, while the outfall is perhaps beneath the surface of the river or tide-water into which it discharges, thus sealing the outlet for gas. Of what use at such times are the rain-water spouts? Every one of these is adding to the pressure, not only by bringing in new volumes of water, but of *air* too; for though the vertical leaders on the house-fronts do not run full, the current through them is so rapid that the air is pulled along with the water into the sewer by friction.

The danger to the house from using rain-spouts as sewer-vents is manifold. The workmanship of such pipes may be defective in the beginning, as it often is, for it is not considered important to make

[1] A lecture by Mr. Edward S. Philbrick, C. E., delivered before the students of the Massachusetts Institute of Technology.
This lecture, although delivered in this course, was published essentially in its present form in the *Sanitary Engineer* some two years ago.

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rain-spouts *air tight.* However tight in the beginning, defects would arise from corrosion, giving escape to the foul gas perhaps close to windows of sleeping-rooms, without notice. Moreover, if put together in the most perfect manner, and kept in good repair, such pipes have open tops at the eaves, generally close under the windows of attic chambers, where they may deliver the poisonous gas to the lungs of some person whom sleep has rendered peculiarly liable to the attack. Such a device for ventilating sewers is at best but a makeshift, and for the above reasons is likely to do quite as much harm as good to dwelling-houses. The character of the poisonous emanations from sewers is not definitely known. What is most to be dreaded in this way is contagion from diseased discharges. We have in city sewers a grand laboratory for such matters. They are here mixed up from all sources and diffused at random, being liable to contaminate with disease whole districts which had otherwise been unvisited by contagion, and polluting the homes of the most cleanly of the population with emanations of the vilest sort. Such enforced contact with our neighbors as comes necessarily with city life is quite bad enough at best. This would be adding to the necessary exposure of the street-car, the school-room and the theatre the refined and ingenious device of inoculating disease by delivering the dangerous influences from a thousand privies and sinks, by metallic tubes opening under the chamber windows of such of our population as are unlucky enough to be obliged to sleep in an attic!

Before discussing the remedies for the collection of noxious gases in sewers, it may be best to consider the natural forces which are at work in the sewers with which we have to deal. First of all we must divest ourselves of the notion that air or gas of any kind can be readily pushed aside and got rid of inside of a sewer, as it can be above ground, where we are familiar with it. So long as air circulates freely in all directions, we are apt to forget its material and substantial character. We know, though we do not always keep the fact in mind, that the air is always exerting an expansive force of some 14.6 pounds per square inch, in all directions, as the reaction under the weight of the fifty miles or more of air above our heads. This is subject to small variations, but never exceeding about 10% of the whole in any one place. This variation is shown by the height of the barometer, and is subject to those hidden causes which we know very little about. So long as the air in our sewers is allowed free communication with the outer air at frequent intervals of space, no difference can exist between the tension of the air within and without; but the moment we obstruct such communication, various causes begin to act, either separately or combined as the case may be, to produce a different tension. Among these causes the following are prominent: —

(*a*) Change of temperature within the sewer.

(*b*) Introduction of water by rain-fall, or by flow of tide, or locally in small sewers by the influx of sewage-water in considerable volume from the neighborhood.

(*c*) Wind-pressure, exerted by winds blowing in at the outfall.

(*a*) Sewers are generally too deep below the surface to be much affected by the changes of temperature of the outer air, except by direct circulation of air through openings. When not disturbed by other influences, their temperature, without ventilation, approaches the mean temperature of the climate, say about 48° or 50° in this latitude. Suppose then, an influx of water to take place from some manufacturing establishment, as is often the fact, heated to 100° Fahrenheit. During the process of cooling the water does not seem to fall in temperature as fast as the air rises. A cubic foot of water weighs about as much as 815 cubic feet of air, while the specific heat of air is less than one-quarter that of water (about 0.238). It follows that when water is cooled by air in contact with it, a cubic foot of water in losing one degree of temperature will heat $\frac{815}{0.238} = 3{,}420$ cubic feet of air one degree on the same scale, or 342 cubic feet will be raised ten degrees. It may be said that the water is cooled in part by contact with the walls of the sewer. Very true; but water has more specific heat than any substance we have to deal with, so it is able to heat an equal volume of bricks, mortar, and earth about 2½° Fahrenheit for every degree it loses thereby. Hence, although the surplus heat of the entering water would eventually all be taken up and scattered in the surrounding soil, this process would occupy a considerable time, during which the air in the sewer would perhaps be temporarily heated some thirty or forty degrees. What would be the effect of this? Air expands about $\frac{1}{460}$ of its own volume for every degree of additional heat we impart to it; so that if heated 24½° we add 5% to its volume at equal pressure, or 5% to its pressure if confined within the sewer at a constant volume. The normal tension of the air is equivalent to about thirty-four feet of water-pressure, as is well known by any one who tries to lift water by pumping. Hence an accession of 5% to its normal tension by raising its temperature 24½° is equal to 5% of thirty-four feet, or 1.7 feet, say twenty inches of water-pressure. None of our traps are sealed by over six inches of water at most, and rarely by more than two or three inches. We have, then, an expansive force more than three times as great as the power of resistance of even a six-inch trap, produced by heating the confined air 22½°. The force developed by heating it 7° would then render worthless any trap having less than six inches depth of water-seal. It will readily be seen that many causes may produce such a change of temperature.

Of course the *lowering* of the temperature by an equal amount would produce an equivalent effect in the other direction, and tend to force the traps from the houses outward, which would often break their seal by taking out their water.

(*b*) The next disturbing force mentioned was by the introduction of water, from rain-storms, of tides, or increase of flow of sewage. Of these, the first two are generally fitful and in large quantity. In our country the rain-fall is generally admitted to the sewers, and their sizes are therefore adjusted to receive it. But the maximum flow of sewage is so small in comparison with that of the rain-water in our climate that the ordinary dry-weather flow is but a driblet when compared with their contents when running full. Such rains as may fill them often come suddenly, and the water enters the sewer at intervals of a few hundreds of feet, by trapped openings, which prevent the exit of air. Sewers that have a limited slope are often nearly or quite filled for considerable lengths. The entrance of water from the streets in such volumes must summarily expel the air that was before in the sewers, if it can find any way to get out. It may often happen that a long sewer is at such times filled with water at two separate parts of its course, while some intermediate portion, having a more rapid fall, may not fill so soon. If the influx of water continues to increase, the air in this portion may soon become subject to a pressure of several *feet* of water and seek exit through every private drain that is in connection. Even if the connections of such private drains were below the water-line in the sewer, the pressure would still be transferred through the water, which will back up in these branch-drains and force back their contents into the houses. The subsidence of the flow when the rain abates leaves voids which the outer air is sure to fill speedily. If direct access is not given, it will find its way through any private drains, emptying all their traps at once, and leaving them to remain empty till filled by drainage from the house they serve, which house in the mean time throughout all its interior becomes a ventilator for the sewer.

In cities which drain into tide-water, the outfalls of the sewers are generally covered at high-water, either every day or at spring tides. If the ends are not provided with gates, the tides enter and fill the sewer as far back as its level allows. If gates exist, they shut with the flow of the tides, and the sewage accumulates within, with a result almost exactly similar to that which would take place with no gates. In either case a large volume of air is displaced by the accumulating water or sewage with every flood-tide, only to be drawn back again when the sewer is emptied on the ebb-tide. If the interior does not communicate freely with the outer air, a pressure of several feet of water must necessarily result, alternating with a corresponding partial vacuum every twelve hours.

Large variations of pressure within the sewers may often occur from the variable quantity of *sewage* as well as of rain-water. Nearly all the sewage from houses is discharged during the hours of daylight; hence there must be a periodic increase and decrease of the amount of air-space within the sewers, depending on the quantity of sewage flowing. This is particularly noticeable with manufacturing establishments, where much water is used during working hours. Of course the air must leave the sewer to make room for the sewage in the morning, and as the flow of sewage diminishes towards evening, the outer air crowds in to fill its place by whatever openings or ducts are found most available.

(*c*) Wind-pressure is the last of the causes named as acting to disturb the equilibrium. This generally acts by blowing in at the outfall. The pressure created there is transferred almost instantaneously throughout the whole system of branch sewers which connect with the main trunk. The amount of pressure exerted by the wind is of course dependent on its velocity. A storm wind with a velocity of fifty miles an hour may not be of frequent occurrence, but a wind with a velocity of forty miles an hour is not uncommon. Such a wind exerts a pressure of eight pounds per square foot, or .055 pounds per square inch. We have nothing to prevent this from entering our houses through the drains except the traps in the latter. The efficiency of these depends entirely upon the depth of their water-seal. Small traps have frequently but a single inch of depth of seal, while a very large number of those which are placed on the waste-pipes of bowls and sinks have less than an inch and a quarter depth of seal. Now every inch of depth of water gives a pressure of only .054 pounds per square inch, which, as just shown, is not enough to resist a high wind, blowing in at the mouth of a sewer, provided its upper ends have no free communication with the outer air to relieve this pressure. Moreover, during the months when our houses are artificially heated, there is always a pressure existing from the outside inward through all the cracks and openings near the basement levels, which will aid the sewer-air in effecting an entrance, there being at such times a slightly reduced pressure or partial vacuum within the house, by means of the heated air in it having less weight than the outer air.

The above considerations show conclusively that whatever remedy is applied should be applied at very frequent intervals of space; for though the disturbing force of the wind does not act with much force except near the outfall of the sewer, all the other disturbing causes which have been referred to are likely to act at any part of the system, and are often acting at various separate places at the same time, while the intermediate parts of the sewer may be filled with water, that would effectually prevent the air from passing from one point to another. In fact, the passage of air within the sewer can never be relied on for any considerable distances, to relieve local pressure, for not only are the intermediate parts liable to be filled

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with water when such communication is most needed, but the resistance offered by friction within the walls of the sewer is very considerable. In short, we must provide local relief to meet and remedy local disturbances, and apply such remedial measures within short distances of one another.

THE CONSTRUCTION OF MUSIC-HALLS.

AT the third session of the Congress of Engineers and Architects, held recently in Italy, one of the questions raised, discussed, and voted upon in the first section, whose duty it was to deal with "Architecture and Civil Construction," was the large inquiry as to the form, the materials, and the decoration proper for a hall for music (*sala armonica*) in general, and for the modern theatre in particular. As to this, the section voted, with an addition in the 7th clause, eleven articles, which were brought forward in an elaborate report by Signors Vivanet and Damiani to the following effect: —

1. That wood is the proper material to choose in order to augment the energy of sound in a room adapted for music; that it is best when of uniform fibre, and especially of fir.

2. That only one kind of wood should be used in the construction of any single room in which the distinct and uniform distribution of sound is desired.

3. That the flooring under any sonorous body should be hollow, placed over a compartment also made of fir, and isolated.

4. That it is most desirable that such a hall should be lined with wood, isolated as much as possible from the general fabric of the building.

5. That the soffit of a theatre, the archivolt of the stage, and the fronts of the boxes, should have their superficies composed of thin planks fitted together like boxes, and that if it is necessary to employ columns they should be of wood, and hollow within.

6. The form of a music-hall should be curvilinear; the elliptic curve is the best. For a theatre, the horse-shoe form, now commonly adopted, should be maintained. It is best when the extremes of the semicircle are prolonged in parabolic lines, so as to present the form of a racket.

7. The stage should be constructed as a separate compartment (the term used throughout is *cassa armonica* — musical box); that it should make part of the scenic recess; and that this should be regarded, in great theatres, as the most important part of the building.

8. That the back of the stage-boxes should be curved and coved with low roofs. It would be better to eliminate these boxes altogether.

9. The soffit of the building should be concave, brought low at the sides, with an ample width around it.

10. The fronts of the boxes should be continuous and low.

11. And finally, in order to increase the musical effect of a theatre, the stage should be as large as possible (by the word *palco-scenico* is intended that separate part of the theatre, which is usually of a rectangular plan, which is occupied by the stage, independently of that part of the latter which may project into the auditorium). It will be seen that these recommendations deserve careful study, and that they show study on the part of the architects who brought them forward. The recommendation of the use of only one kind of wood, and that by preference fir; of the lining of the whole interior of rooms intended for music with wainscot; of the division of the wall-lining and of the floor from the masonry of the structure; of the disuse of metal columns; and of the care to be taken in the disposition and workmanship of the stalls, so as to prevent them from absorbing or echoing an undue portion of the sound produced, — are all worthy of consideration. — *The Architect.*

MR. HYATT'S EXPERIMENTS ON CONCRETE FLOORS.

A CORRESPONDENT of the *Building News* comments as follows on Mr. Hyatt's statement of the circumstances and conditions of his experiments, as published in our issue for May 15: —

"The further details of Mr. Hyatt's experiments clearly indicate that the strength of the short brick beams is due to the iron blades, two inches by one-eighth inch thick, introduced into the lower half of the beam, a result which might have been anticipated with beams only five feet long. If Mr. Hyatt will formulate his results, he will perceive the advantages, which he obtains from beams too short to be of any practical use in floor construction, become less and less as the lengths used for floors is approached. This arises from the difference which exists between the bending moments of iron and brick in cement, and from bending taking place as the cube of the length. Thus in a beam twenty feet long, the angle of rupture of the brick will have been reached long before the iron blades will have bent through such an angle as to give any efficient resistance against the bending of the bricks in cement. In fact, the differences between the bending moments in the twenty-feet beam have become magnified sixty-four times, so that it is no wonder the differences which were of no account in the short beam become of immense importance in beams of greater length. Again, if Mr. Hyatt will formulate his results for a beam fixed at the two ends, he will notice the neutral axis is changed from the lower quarter at the centre of the beam to the upper quarter at the two fixed ends, and as there is no iron in the upper quarter of the beam, the advantage of using iron is lost even for short beams, and thus the formula of fixing the end of a homogeneous beam will not apply. Again, if Mr. Hyatt will formulate his results for a square floor resting upon four walls, he will notice that as the iron blades only run in one parallel direction the formula for a homogeneous plate supported on four walls will not apply, and if the edges of the floor are fixed, the formula will be still further removed from that of a homogeneous square plate fixed at the four edges. As this last method is the one usually adopted in practice, it is only necessary to say that the usual opinion as to the strength of such a plate is as much as five times that of the same plate supported like a beam with the ends free. It is from these considerations that those skilled in fire-proof floor-construction aim in the first place to obtain a homogeneous plate securely fixed into four walls. If, however, iron is to be used, then the iron ought to be made of sufficient strength to resist the stresses independently of any apparent stiffness derived from bedding the iron in cement; otherwise there is the very greatest danger of the iron being sheared at the walls. If Mr. Hyatt's construction were applied to floors twenty feet span, the iron would inevitably be sheared from the walls, unless the bricks in cement were of sufficient strength to resist the stresses quite independently of the iron blades.

I am, etc., A. C. P."

A SHAKESPEARE MONUMENT.

ONE of the pieces of sculpture which will probably attract no little attention at the present exhibition of the Royal Academy, but which for obvious reasons we forbear to criticise here, is a seated figure of Hamlet contemplating the skull of Yorick, which has been modelled by Lord Ronald Gower. Another figure by the same young nobleman has been accepted for the Paris *Salon*, and represents young Prince Hal lifting the crown above his head, and pausing, as it were, for a moment before he dares to place it on his brow. The Prince is very simply clad, and is standing on his left foot, the right drawn slightly back, and the right knee bent. Slim, graceful, and vigorous, with his tightly fitting jerkin and trunk hose, the figure has almost as purely sculpturesque an outline as though it were nude. But though so simple, it is not too severe; and though the figure is poised in complete rest and not without a dignified gravity, there is such spirit in the limbs and such latent audacity in the face that we feel the peace and solemnity is but momentary. Not only has the artist seized the happy moment of arrested action to give the repose necessary to a work of sculpture, but he has suggested the previous moment of thoughtless sport and the future of crown-shadowed care. Whatever future criticism may have to say of this work, there can be no difference of opinion as to the originality and spirit of the conception and the care with which it has been executed. There are signs of fresh vitality in the school of British sculpture, but few more favorable than this statue, which, while telling its story by line and contour alone, is yet thoroughly English and living, appealing in sculpturesque language direct to the knowledge and feelings of Englishmen.

That Lord Ronald Gower is no mere *dilettante*, seeking the applause so easily awarded to one of his rank by dallying with the arts, but a painstaking artist whose heart is in his work, and who is determined to be master of it, will be still more evident when we say that this figure and that of Hamlet are only installments of a greater work in commemoration of the greatest English poet. These are, then, two out of four figures representing famous characters of Shakespeare which are to decorate the base of a large monument to the poet on which Lord Ronald has been engaged for some years. The other characters chosen are Sir John Falstaff and Lady Macbeth, the former of which is finished. On the latter, which will complete the work, he is busily engaged. The monument will be surmounted by a group representing Tragedy and Comedy crowning the bust of Shakespeare. The bust follows in costume and general appearance that in the church of Stratford, but it is somewhat more youthful and spiritual in appearance than the rather stiff and stolid effigy which is so familiar to us. Tragedy is standing erect on the left of the plinth on which the bust of Shakespeare is placed. Young, beautiful, and sad, she holds the wreath in her right hand over the poet's head, the arm being bare to near the shoulder, and extended almost to full length. She is half shrouded in a mantle, which covers her head like a hood, and is gathered round her waist by the left hand. On the other side is Comedy, a figure of exuberant joy, with loose locks and careless dress, scarcely able to perform her part of holding the wreath for the laughter which shakes her sides. She appears as if she had run with gay willingness to her task, and to be half embracing the effigy of her lord and master, her laughing head turned, as it were, to the audience in confident appeal for sympathy in her love for him. The action of this figure is, we think, a little excessive, and not altogether graceful in the lower limbs; but it is a vigorous embodiment, and the composition of the three heads and the arms of the two supporters is bold and successful.

The whole work, when completed, will be too large for any ordinary gallery, and it is to be hoped that arrangements may be made for its exhibition at the Crystal Palace or elsewhere, where it may be fully seen and fairly criticised. — *The Academy.*

COMPETITION FOR THE BOSTON ART-CLUB CLUB-HOUSE.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — Will you please inform me through the columns of your journal what decision (if any) has been reached in the competition for the Boston Art-Club House? Is it not time we should hear something about it? "INTERESTED."

[We understand that no decision has yet been reached. — EDS.]

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NOTES AND CLIPPINGS.

Obituary. — At Plainfield, N. Y., May 26, of typhoid pneumonia, J. D. Stevens, of the late firm J. D. Stevens & Son, New York, N. Y.

Operatives' Dwellings Competition. — The successful competitors in the recent competition for operatives' dwellings are Mr. F. E. Alden, Boston; Messrs. Allen and Kenway, Boston; and Mr. A. Carpenter, Hartford, Conn.

The Fall of Alamo. — The spot selected for a monument to commemorate the fall of Alamo is in the centre of the Alamo-plaza, in front of the Alamo building, at San Antonio, Texas.

The Life of Railroad Bridges. — It is reported that Professor George L. Vose of Bowdoin College, who is regarded as an authority upon such subjects, says that two hundred railroad bridges have fallen within the past ten years.

The Carrara Marble Quarries. — Of the 94,367 tons exported in 1878 from the quarries of Carrara and Massa, Italy made use of 33,081 of which nearly 3,000 were worked and carved. 61,286 were exported abroad, of which nearly 7,000 were worked and carved. The marble is embarked for foreign export on Italian vessels of small tonnage, 80 tons at most, and carried to Genoa and Livornia. Carrara has 387 quarries, 327 of which employ 36,050 workmen, besides 350 women and children who carry water to the workmen in the mountains. The establishments where the marble is worked and carved, employ about 650 workmen. They contain 85 hydraulic saw-mills, worked by the Carrione. In and about Carrara itself there are 147 studios and an academy of Fine Arts. The wages of the workmen vary from 1 franc 8 centimes for the quarrymen, to 4½ and 6 francs for the sculptors. The Carrara and Massa marbles are of several varieties, namely statuary marble, veined marble, *bardiglio*, and clear white. The first quality of statuary marble costs from 300 to 1,600 francs per cubic metre; the second quality costs from 250 to 550 francs; the veined costs from 160 to 550; *bardiglio* from 190 to 280; the first quality of clear white from 250 to 280, and the second quality, 180.

A Non-Sequitur. — "Dr. S.— A.— the veteran medicine man, intends to further improve the street in his vicinity by the addition of another dwelling-house. The doctor has added very much to this part of our village by the erection and remodelling of houses, and also the building of the corporation laboratory, with its imposing towers and artistic design. All of these improvements have been designed and constructed under the personal instruction of the Doctor, which, considering he began his pilgrimage in the last century, is evidence that he has reached the acme of his profession."—*Rhode Island Paper.*

Sand and Lime Plastering. — A correspondent of the *Northwestern Lumberman*, says that a friend some eighteen years ago, in building a residence, insisted upon the plastering mortar for the walls being mixed in proportion of one of lime to eight of sand. The plasterer warmly demurred, but at last consented. His objection was that it would be hard to work, and he could not spread so much in a day. The building was of two stories, sixteen by thirty feet, with an L eighteen by twenty feet, and set on cedar posts. These latter have allowed considerable settling to the building; yet at the end of eighteen years the plastering is firm and with scarcely a crack in it, and may be struck with a hammer without breaking, while in no place have any indications of crumbling become manifest.

The Ruskin Museum. — The London *Times* says: The museum founded by Mr. Ruskin at Sheffield is attracting art-students not only from all parts of England, but from America, and it has become necessary to enlarge it. Crowded with precious stones, rare pictures and valuable books, there is not much space for the students; but Mr. Ruskin has drawn out a plan for the provision of a new wing, or a separate gallery, in which he intends to place a fine collection of prints and casts. The cost of extension is estimated at £500, which amount it is proposed to raise by subscriptions. The museum in course of formation by the St. George's Guild, especially for the use of the artisan students of Sheffield and its neighborhood, is accessible to all. Mr. Ruskin says: "I am, of course, ready to receive subscriptions for St. George's work from outsiders, whether zealous or lukewarm, in such amounts as they think fit. At present I conceive that the proposed enlargements of our museum at Sheffield are an object with which more frank sympathy may be hoped for than with the agricultural business of the guild," and that this is a correct conception is proved by the fact that subscriptions for the extension of the museum are being received from London and other places. "My casts from St. Mark's," Mr. Ruskin writes, "are lying in lavender — or at least in tow — invisible and useless till I can build walls for them; and I think the British public would not regret giving me the means of placing and illuminating these rightly; and, in fine, here I am yet for a few years, I trust, at their service; ready to arrange such a museum for their artisans as they have not yet dreamed of; not dazzling nor overwhelming, but comfortable, useful, and in such sort as smoke-cumbered skies may admit, though not on the outside otherwise decorated than with plain and easily-worked slabs of Derbyshire marble, with which I shall face the walls, making the interior a working-man's Bodleian Library." The casts are from Venice, and have been made under Mr. Ruskin's own superintendence by permission of the Italian Government. They are taken from sculpture that adorns the Ducal Palace and the Cathedral of St. Mark, chiselled between the ninth and the fourteenth centuries, and are very valuable contributions to art. The new gallery will also contain a painting of the west front of St. Mark's, a commission for which has been given by Mr. Ruskin, and the artist will receive £500 for his work. It was originally Mr. Ruskin's intention to extend the museum at his own cost; but subscription-lists are now lying at the local works, and there is little doubt the necessary amount will be obtained without difficulty.

Denis Papin. — Seven cities disputed the honor of having been the birthplace of Homer, and nearly as many countries contest that of having given to the world the inventor of steam, or, more precisely, of steam as applied to the propulsion of engines. Yet if it really was a steamboat that Denis Papin brought down the Weser to Loch in September, 1707, and which was thereupon destroyed by the Mariners' Guild of the Weser on the enlightened ground that they had the exclusive right to navigate that river, it is certain that neither Watt nor Fulton could claim priority in a discovery which was thus made known before either of them was born. There was long a question as to where Denis Papin himself was born. But in 1834 the record of his birth was discovered among the archives of the ancient city of Blois. It has therefore since been conceded that this eminent physicist, like the theologian of the like surname, was born at Blois, and that this occurred the 22d of August, 1647. If any doubt exists as to his invention of the steam-engine, there is no doubt that Papin rendered distinguished services to science. His researches paved the way for improvements that have been of signal value to the race. The destruction of his vessel was a crushing blow to him. He had not the means to build another. As the mayor of Blois said, he had always had little; he now had nothing. But records of what he did, both before 1707 and during the next ten years, at the end of which he died, remain and show the validity of Papin's claim to be held in grateful memory by the fellow-beings whom he lived to benefit. The mayor of Blois has now written to New York, his letter being dated April 27, 1880, to say that a statue is to be erected to Denis Papin in his native town, and asking some moderate contribution from America towards executing the design. "The mite of the United States," writes the mayor, "however small it should be, would be a memory which the town of Blois would cherish. It would be a proof of the sentiments of sympathy which unite the two great republics." This appeal addressed to the great capital of the West, whose sea portals are soon to be graced by a colossal statue which a Frenchman has designed, should evoke a prompt and generous recognition, and it will be pleasant to hear that some of our wealthier citizens have hastened to honor themselves by extending it. In this case more, than in ordinary cases, he will give twice who gives quickly. — *New York Evening Post.*

Wood Fuel. — It is interesting, and to many persons it may be profitable, to know the comparative value of different kinds of wood for fuel. Shellbark hickory is regarded as the highest standard of our forest trees, and, calling that 100, other trees will compare with it for real value as fuel for house purposes as follows; Shellbark hickory, 100; pignut hickory, 92; white oak, 84; white ash, 77; dogwood, 75; scrub oak, 73; white hazel, 72; apple-tree, 70; red oak, 67; white beech, 65; black birch, 62; yellow oak, 60; hard maple, 59; white elm, 58; red cedar, 56; wild cherry, 55; yellow pine, 54; chestnut, 52; yellow poplar, 54; butternut and white birch, 43; white pine, 30. It is worth bearing in mind that in wood of the same species there is a great difference, according to the soil in which they grow. A tree that grows on a wet, low, rich ground will be less solid and less durable for fuel, and therefore of less value, than a tree of the same kind that grows on a dry and poor soil. To the ordinary purchaser, oak is oak and pine is pine; but for house use the tree grown on dry upland and standing apart from all others is worth a great deal more. — *Exchange.*

Soot. — London chimney-sweeps say that the value of a bushel of soot and the cost of the quartern loaf always tally. Owing to the amount of sulphate of ammonia it contains, soot used to be exported in considerable quantities to the West Indian sugar plantations, and it is still a valued manure at home. Sheep and cattle feed greedily on pasture that soot has fertilized, and it imparts a markedly bright green to grass and grain. From it, moreover, bistre is manufactured, and coloring matter for paper-hangings. Like pyroligneous acid, it has been used for the curing of meat, and with a similar effect — the imparting to the preserved provision a taste as if it had been smoked. The best soot is said to be that swept from kitchen chimneys, well impregnated with hospitable fumes. — *Boston Advertiser.*

The British Copyist in Italy. — The new arrangements at the Uffizi Museum and Galleries have now been made, and all the appointments filled up. By the new regulations, permission to copy will be given only to applicants who can give proofs of capacity and training. They must produce certificates from such public bodies as our Royal Academy or Science and Art Department, and it is hoped that these certificates will be given with due care to competent persons only. They must be presented through a consul. "These regulations," our correspondent at Florence writes, "if not especially directed against British applicants, will certainly affect them more than any others. Generally speaking, the English are the only people who venture to apply for permission to copy in public galleries abroad without a knowledge of, at least, the rudiments of art. They, however, make no scruple of occupying places and taking up the keeper's time while they make daubs which help to render English art and taste a matter of ridicule to foreigners. A copyist of six years' standing in our National Gallery was sharply dismissed a short time ago from the Uffizi for incapacity. There is, indeed, no test required by the National Gallery with regard to capacity or efficient training on the part of copyists, and, this being the case, the Florentine authorities refuse to admit any certificate coming from that quarter." This is not a pleasant reputation to have as a nation, but it is to be feared it is deserved, for, while in general English applicants are the most incompetent, they are, at the same time, the most confident. It is to be hoped that these new regulations will open their eyes a little to their own shortcomings, and teach them the desirability of knowing the elements of art before they sit down to copy the works of the great masters. — *The Academy.*

Brumidi's Successor. — It is reported that Signor Filippo Costaggini of New York has been appointed to carry out the unfinished work of Brumidi in the Rotunda. He was a personal friend of the late Signor Brumidi, who before he died expressed the wish that the completion of his work might be entrusted to his countryman.

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BUILDING INTELLIGENCE.

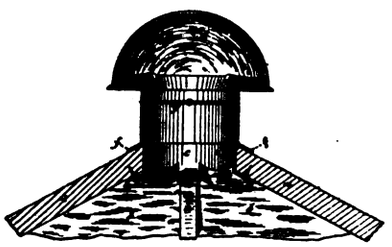
[Reported for The American Architect and Building News].

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

226,625. SKYLIGHT HATCH. — Semon J. Pardessus, Brooklyn, N. Y. *a a* is the sash-frame of the hatch, made of wood or iron, and rabbeted to receive the glass panes *b b* in the usual manner. *c* is an annular metallic ring, provided with a base-flange, *d*, arranged to correspond with the inclination of the sash-frame



and glass panes, and to project a sufficient distance to form a firm support, this flange being made with depending recesses, as shown, to receive the sash-frame, *a a*. *e* is an annular ring, of corresponding diameter with the ring *c*, and provided with an inclined depending base-flange, *f*, similar to the flange *d*. This annular ring *e* rests upon the top of the ring *c*, leaving a space between the base-flange, *f*, and corresponding flange, *d*, of the ring *c*, to receive the sash-frame and the glass panes. The annular ring *e* should project a sufficient distance above the apex of the hatch to receive a removable cap, as shown, and contain a pivoted gate, *g*, for regulating the size of the opening.

227,875. PORTABLE FOLDING DERRICK. — Edward C. Bennett, Philadelphia, Penn.

227,877. HYDRAULIC AIR COMPRESSING APPARATUS. — James M. Bois, Aurora, N. Y.

227,878. ROCK-DRILLING MACHINE. — Samuel G. Bryer, Saugus, Mass.

227,889. SHADE AND CURTAIN ROLLER. — Jos. R. Finney, Pittsburg, Penn.

227,892. WRENCH. — Lawrence Glynn, Cambridgeport, Mass.

227,893. ELEVATOR. — Charles H. Golding, Bodie, Cal.

227,896. METHOD OF LAYING CONCRETE PAVEMENTS. — Charles Heuse, Washington, D. C.

227,899. CARRIAGE FOR ROCK DRILLS. — Nathan W. Horton, Wilkesbarre, Penn.

227,908. ROCK-DRILLING MACHINE. — Robert Magill, Pittsburg, Penn.

227,920. GEARING FOR ADJUSTABLE AWNINGS. — E. Otto Pohl, Philadelphia, Penn.

227,934. FIRE-PROOF SHUTTER. — Elias H. Walton, Cincinnati, O.

227,937. BLIND-SLAT ADJUSTER. — Jonas F. Wile, New Pittsburg, Ohio.

227,964. FILTER. — Ezra Buss, Springfield, Ohio.

227,978. WINDOW-BUTTON SECURER. — Kate D. Hughes, Washington, D. C.

227,985. METHOD OF PROTECTING IRON COLUMNS FROM FIRE. — John McGlensey, New York, N. Y.

227,992. KNOB ATTACHMENT. — Martin Penfield, New Britain, Conn.

228,000. SOLDERING IRON. — Willard C. Smith and B. Duane Joslin, Kinderhook, Mich.

228,027. BEVEL-SQUARE. David Bissehl, Detroit, Mich.

228,030. WIRE-LATHING. — William Brennan, New York, N. Y.

228,044. EARTH AUGER. — Andrew J. Dine, Xenia, Ind.

228,045. DIVISION-BLOCK AND HOLDER FOR STONE SAWS. — Edward D. Dougherty, Philadelphia, Penn.

228,052. BUILDING-BLOCK. — Charles W. Frost, Philadelphia, Penn.

228,056. STEAM ROCK-DRILL. — Geo. M. Githens, Brooklyn, N. Y.

228,062. PENCIL ATTACHMENT FOR PANTOGRAPHS. — James T. Gregory, Athens, Tenn.

228,084. — SEWER AND CATCH-BASIN. — John F. Lavery, Chicago, Ill.

228,091. SEWER-GRATING. — Albien H. Lowell, Manchester, N. H.

228,107. ELEVATOR. — Chas. R. Otis, Yonkers, N. Y.

228,115. COMBINATION TOOL. — James H. Randell, Acworth, Ga.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Twenty-one (21) building permits have been issued since the last report, and the following only are of sufficient importance to be mentioned:

Mary Whalen, three-st'y brick dwell., 33 Raborg St., between Arch and Pine Sts.

N. H. Hall, three-st'y brick and stone warehouse, 48 Thames St., between Broadway and Bond St., 50' x 80'.

Jacob Kern, three-st'y brick dwell., 229 Wolf St., between Alice Ann and Lancaster Sts.

Ida Watkins, three-st'y brick dwell., on Gilmor St., near Edmonson Ave.

Wm. Justis, addition and improvement to dwell., 171 Baltimore St.

CLUB-HOUSE. — Mr. Charles L. Carson, architect, is preparing drawings for improvements and additions to the Maryland Club-House, which will cost $7,000 or $8,000.

SCHOOL-HOUSE. — Mr. E. F. Baldwin, architect, is preparing drawings for the new Grammar School, to be built cor. Eastern Ave. and Burk Sts., to be 53' x 107', two stories high; cost, $15,000.

CHURCHES — Mr. E. F. Baldwin is also preparing drawings for St. Leo Catholic church, to be built on the corner of Exeter and Stile Sts., 53' x 95', of brick; cost, $25,000.

The corner-stone of the new Polish church to be built on South Ann St. is to be laid June 13.

HOUSES. — Mr. John McFadden is about to build a four-st'y store and dwell., on the cor. of Lexington and Liberty Sts., to be of brick and stone, and cost $4,000; Mr. Chas. L. Carson is the architect. Mr. Carson is also preparing drawings for additions to and remodelling dwellings for Mr. Wm. H. Cole, cor. Monument and Park Sts., to cost $8,000, and store and dwelling for Mr. Geo. Blome, on Baltimore St., to cost $4,000.

Boston.

BUILDING PERMITS. — *Brick.* — *East First St.*, for City of Boston, 1 Laundry, 67' x 71'; Weston & Shepard, builders; G. A. Clough, architect.

490 *Commercial St.*, F. N. Robbins, 1 store, 31' x 48', 4 stories; J. Kelley, builder.

80 *Hampshire St.*, for Roxbury Carpet Co., 1 factory, 50' x 72'; Nelson Curtis, builder.

Wood. — *Tremont St.*, Ward 22, for House of Good Shepherd, 1 reformatory institution for girls, 25' x 55'; J. Burke, builder.

Thatcher Ave., 1 dwell., 24' x 24'; L. C. Norton, owner and builder.

Neponset Ave., for C. H. & J. W. Beckford, 1 storehouse, 24' x 24'; L. Hunt, builder.

Webster Garden, for Mrs. Chas. Sumner, 1 pavilion, 30' x 50'; A. B. Pinkham, builder.

Permits for May, and for five months of this year:

	May.	Five Months.
Brick,	26,	127
Wood,	33,	186
Alterations,	233,	924

HOTELS. — A hotel is now building for Mr. George B. Taylor, (who also orders materials), 25 feet on Columbus Ave., and 92 feet on Berwick Park. The building will be six stories high, and will cost about $30,000. Mr. Fred Pope is architect.

Mr. Pope also made designs for the Hotel corner Cazenove St., and Columbus Ave., which is now being plastered. It is four stories in height. William Cogswell, owner and superintendent.

Brooklyn.

BUILDING PERMITS. — *Waterbury St.*, cor. Ten Eyck St., 1 two-st'y brick factory, 50' x 120'; cost, $11,000; owner, New York Bagging Co.; architect, A. Montgomery; mason, John McQuaid; carpenters, Jenkins & Gillies.

Ten Eyck St., No. 15, 1 three-st'y frame tenement, 25' x 53'; cost, $4,000; owners, J. & W. Murphy, 17 Ten Eyck St.; architect, John J. Clyde; builder, George Lehrian and Joseph Frisse.

Meserole St., 1 two-st'y brick dwell., 22' x 28'; cost, $2,400; owner, J. Bigemnan; architect, F. J. Berlenbach; builder, William Bayer.

Chicago.

BUILDING PERMITS. — Weir & Craig, three-st'y addition and one-st'y shop, Stewart and Archer Aves., cost, $8,000.

A. A. Bronchere, two-st'y brick dwell., 25' x 72', 120 Dayton St.; cost, $3,500.

Thomas Mackin, two-st'y brick dwell., 20' x 40', 280 Indiana St.; cost, $2,500.

J. Feales, two-st'y brick dwell., 20' x 52', Throop and Sixteenth Sts.; cost, $2,600.

A. Potzge, two-st'y brick dwell., 25' x 62', Twelfth St. and Ashland Ave.; cost, $4,300.

H. Elfring, two-st'y brick store, 23' x 56', No. 391 Chicago Ave.; cost, $3,800.

Josephine Seckert, two-story brick dwell., 22' x 40', 26 Depuyster St.; cost, $2,000.

J. Fitzsimmons, two-st'y brick store 24' x 103', No. 275 South Clark St.; cost, $1,700.

P. Adler, two-st'y brick dwell., 22' x 48', No. 202 West Huron St.; cost, $3,300.

W. Karge, three-st'y brick store, 24' 6" x 60', No. 811 Halsted St.; cost not stated.

H. G. Gurren, 2 two-st'y brick stores, 79' x 52', Indiana Ave., near Osborn St.; cost, $7,000.

Union Steamboat Co., two-st'y brick ware-house, 78' x 76', Market St., near Randolph; cost, $7,000.

John Borden, alterations of Hamlin's Theatre, 87 Clark St.; cost, $30,000.

SCHOOL-HOUSE. — The Board of Education has authorized its building committee to order plans and specifications for the erection of a fifteen-room schoolhouse on the Walnut St. and Kedzie Ave. site. Also to change the proposed schoolhouse at the corner of Franklin and Huron Sts., from a fifteen to a twelve-room building.

New York.

ALTERATIONS. — *Sixth Ave.*, cor. Fourteenth St., four-st'y brick extension, 104' x 75'; cost, $36,000; owner, Rhinelander estate; architect, James J. Lyons.

Broadway, cor. Forty-First St., internal alterations and repairs; cost, $2,000; owner, Wm. L. Pomeroy; builders, Van Dolsen & Arnott.

North Washington Sq., No. 17, internal alterations and repairs; cost, $3,086; owners, estate of Geo. P. Rogers; architect, Geo. Martin Huss; mason, H. M. Reynolds.

Forty-Fourth St., an iron water-tank to be built on roof; cost, $3,500; owners, East Side Rendering Association; architect, George Brown; builders, Murphy & McGinty.

West Fourteenth St., No. 103, one-st'y brick extension on rear, 22'2" x 28', a store front put in; cost $3,000; owner, Marshall O. Roberts; architect, John B. Snook.

Fifth Ave., No. 267, four-st'y brick extension, 29 10½" x 27' 4"; cost, $8,000; owner, F. C. Lawrence; architect, G. E. Harney; builder, J. J. Tucker.

Barrow St., No. 70, to be raised one story; cost, $3,000; owner, Edwin O'Neil; architect, Henry Palmer; builder, Ed. Denby.

West Tenth St., No. 31, to be raised one story; also a five-st'y extension, 30' 6" x 25' 4", and interior alterations; cost, $6,000; owner, L. J. Callanan; architects, Thom & Wilson.

East Fifty-Fourth St., No. 8, to be raised to four stories; cost, $2,800; owner, Geo. W. Montgomery; architects, Sillimann & Farnsworth; builder, Eluard Smith.

BUILDING PERMITS. — *Lexington Ave.*, 12 two-st'y brick dwells.; cost, $2,500 each; owner and builder, Chas. Welde, 371 East One Hundred and Twenty-Third St.; architects, Smith & Howe.

East Sixty-Third St., Nos. 105 *and* 107, 2 three-st'y brick stables, each 25' x 90'; cost, $10,000 each; owners, O'Reilly Bros., 115 East Forty-Fourth St.

Sixty-Third St., 1 four-st'y brick (brown stone front) dwell., 18' x 55'; cost, $14,000; owner, Francis Crawford, 956 Third Ave.; architect, Fr. S. Barus.

Seventy-Second St., 3 four-st'y brick (brown stone front) dwells., each 16' 8" x 55'; cost, each, $14,000; owner, Thomas Kennedy; architect, Fr. S. Barus.

One Hundred and Thirty-First St., 3 three-st'y brick (brown stone front) dwells, each 16' 8" x 50'; cost, each, $10,000; owners and builders, McManus & Doke, on the premises; architect, Thomas S. Godwin.

One Hundred and Twenty-Second St., cor. Second Ave., three-st'y brick dwell., 17' 6" x 43'; cost, $10,000; owner and builder, A. B. Birdsall, 108 East Twenty-Third St.; architect, J. H. Valentine.

One Hundred and Twenty-Second St., cor. Second Ave., 1 three-st'y brick dwell., 16' x 43'; cost, $10,000; owner and builder, A. B. Birdsall; architect, J. H. Valentine.

One Hundred and Twenty-Second St., 6 three-st'y brick (stone front) dwells., each 14' x 43'; cost, each, $9,000; owner and builder, A. B. Birdsall; architect, J. H. Valentine.

Fifty-Seventh St., 4 four-st'y brick (brown stone front) apartment houses, 22' x 65'; cost, each, $14,000; owner and builder, John Livingston, 304 East Fifty-Eighth St.; architect, J. H. Valentine.

Eighty-Fifth St., 2 four-st'y brick (brown stone front) apartment houses, each 20' x 62'; cost, each, $13,000; owner, O. W. Loeffler, 113 East Seventy-Seventh St.; architect, John C. Burne; mason, James A. Frame.

Sixty-Fifth St., 5 four-st'y brick (brown stone front) apartment houses, each 20' x 60'; cost, $9,000 each; owner, W. H. Browning, 441 East Seventy-Seventh St.; architect, A. B. Ogden.

Greene St., No. 106, 1 five-st'y brick (iron front) store, 25' x 85'; cost, $26,000; owners, Mrs. D. L. Bennett *et al.*, 49 Lafayette Pl.; architect, Henry Fernbach; masons, Amos Woodruffs & Son; carpenters, McGuire & Sloan.

One Hundred and Sixteenth St., to One Hundred and Seventeenth St, 50 West Sixth Ave., one-st'y frame circus building, circular form, 200' in diameter, no roof; cost, $10,000; owner, Angel Fernandez, 413 Sixth Ave.

Seventy-Seventh St., a brick and wood hospital, 120' x 18'; cost, $8,000; the German Hospital, owners; H. Schurzmann, architect; C. W. Clappert, builder.

West Forty-fourth St., No. 348, a brick workshop, 25' x 40'; cost, $2,500; Peter Kay, builder.

East Forty-fifth St., No. 307, a brick five-st'y tenement, 25' x 75'; cost, $10,000; Erdt & Weyand, owners; Thom & Wilson, architects.

THE BRICK MARKET. — Bricks have fallen in price to a wonderful extent, and the market is thoroughly demoralized. There is a glut of production and a temporary inactivity in building gives small chance of recovery. There is little show for any marked improvement, unless the low prices bring a great deal of extra work.

HOUSES. — On Seventy-fifth St., corner Lexington Ave., Alderman Farley will build six brown-stone-front houses.

Philadelphia.

DURING the past month the records of the office of the Building Inspector show that 349 permits for the construction of new buildings and alterations and repairs on old structures were issued in the month of May. Of the entire number, 83 permits were granted for alterations and additions, 68 for back-buildings, 3 one-story dwellings, 64 two-story dwellings, 63 three-story dwellings, 3 two-story stores, and 10 three-story stores and dwellings. The miscellaneous permits embraced 14 for stables, 8 factories, 1 chapel, 1 Sunday-School, 4 shops, 3 engine and boiler houses, 2 dye and dry-houses, 1 brewery, 2 pump-houses, 4 dry-kilns, 2 foundries, 1 bleaching-house, 1 varnish-factory, 4 warehouses, 1 ice-house, and 2 store-houses.

ASYLUM. — The designs of Messrs. Wilson Bros., & Co., have been accepted for the proposed Presbyterian Orphan Asylum at West Philadelphia. The building will be of brick and stone.

St. Louis.

BUILDING PERMITS. — Twenty-seven permits have been issued since our last report, seven of which are for frame buildings of slight importance. Of the rest, those worth $2,500 or over are as follows: —

Owners Name.	Use.	Stories.	Rooms.	Cost.
J. A. Conlon,	Dwell.	2	8	$3,500
V. J. Paul,	Dwell.	2	8	4,000

Washington, D. C.

The following is a list of contracts made by Gray & Page, architects, during the past month, for buildings in this city.

House for Beldon Noble, Esq., of New York, N. E. cor. of Eighteenth St. and Massachusetts Ave., 60' x 70'; cost, $50,000.

House for Judge A. B. Haguer, of this city, on

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H St., between Eighteenth and Nineteenth Sts., opposite Park; cost, $15,000.

House for Gen. P. V. Hagner, of Troy, New York, H St., between Eighteenth and Nineteenth Sts.; cost, $10,000.

House for Judge C. P. James, of this city, Massachusetts Ave., between Eighteenth and Nineteenth Sts.; cost, $9,500.

House for W. V. Marmion, of this city, H St., between Fifteenth and Sixteenth Sts.; cost, $14,000.

Boat-house for Columbia Boat Club, situated at foot of High St., Georgetown, D. C.; cost, $4,000.

House for Major Goodfellow, of U. S. Cost Survey, Nineteenth St., between N and P Sts.; cost, $8,500.

Four houses, on Twentieth St., between N and P, for Mrs. P. W. Page; cost, $15,000.

House for M. Bailey, Esq., of this city, situated on Dupont Circle; cost, $20,000.

General Notes.

ATLANTIC CITY, N. J. — The Union Transfer Co. will build a frame building from the design of Messrs. Wilson Bros. & Co., of Philadelphia. The contractor is Mr. Jno. S. Steele, of Philadelphia.

AUGUSTA, GA. — A factory is to be built for the Sibley Cotton Mill Co.

BELLEVUE, KY. — Mr. Gieger has broken ground on Fairfield Ave. for a new store.

BERGEN POINT, N. J. — The corner-stone of the new St. Mary's Roman Catholic church was laid Thursday, May 27. The structure will cost about $85,000.

CLEVELAND, O. — Messrs. Heard & Smith, architects, are to remodel the Idaka Chapel, on Kennard St., at a cost of some $10,000.

EMMETTSBURG, Io. — Roman Catholic church, brick and stone; cost, $10,000; B. J. Bartlett, architect, Des Moines, Io.

Store for T. H. Tobin; cost, $4,000; B. J. Bartlett, architect, Des Moines, Io.

FERGUS FALLS, MINN. — A new passenger depot is to be built on the north side of the river, between Whitford and Mill Sts.

HOLYOKE, MASS. — Caspar Ranger has completed the plans for the three-story block which Martin Smith will build at the corner of Main and Spring Sts.

C. B. Davis will build a large livery stable behind the Windsor Hotel, some time this summer.

KANSAS CITY, MO. — The Board of Education has chosen a site between Third and Fourth Sts. and Gillis and Troost Ave. for a new brick school-house, which will cost $10,000.

LEBANON, O. — W. C. McClintock, proprietor of the *Western Star*, will erect a two-story brick building on the old site.

LONG BEACH, L. I. — Mr. Bruce Price, of New York, the architect of the new hotel, is personally supervising the work, which is now nearly completed. The hotel is 875 feet long. Mr. Price has also designed 18 cottages and 1275 bath houses.

LOUISVILLE, KY. — L. H. Bell is to build a two-and-a-half-story brick dwelling on Second St.; cost, $3,000.

MANCHESTER, N. H. — Bids for building the opera-house were received by the architect, Mr. G. T. Fanning, May 26.

MILWAUKEE, WIS. — Messrs. Munger & Wheeler, architects, of Chicago, are building a grain-elevator for the Chicago, Milwaukee & St. Paul R. R., which will cost $300,000.

MONTREAL, CAN. — It is proposed to build, in the heart of Montreal, a grand central railroad depot, to be reached from the various lines by an elevated railroad running through the streets.

NORWICH, CONN. — The First Baptist Society is to build a $7,000 church at the corner of West Main and Fairmount Sts.

OTTAWA, ILL. — Messrs. Thos. and Hugh Colwell are building a new house for Dr. Jos. Stout, of this city; cost, $3,000; F. S. Allen, architect.

PARSONS, KAN. — School-house, brick and stone; cost, $10,000; B. J. Bartlett, of Des Moines, Io., architect.

PICTOU, N. S. — The corner-stone of the new academy was laid May 27.

PITTSFIELD, MASS. — J. L. Peck is putting up a four-tenement block on the factory grounds, and the Pontoosuc Company are erecting a number of buildings in the same place.

PROVIDENCE, R. I. — There is now nearing completion corner Tremont and Westminster Sts., for Messrs. Shepard & Wilson, a store measuring 40′ x 135′. Wm. Urquhart, builder; Mr. Fred Pope, of Boston, is the architect.

John P. Smith is building three tenement-houses, to cost about $3,000 each, on Parade St.; contractor, Stephen Peck.

D. C. Moulton is building a dwelling, corner of Mawney and Greenwich Sts.; mason's work, Henry Mason; carpenter's work, Moulton & Ingraham; architect, Geo. W. Cady.

Edward E. Darling is putting up a dwelling house, corner of Broad and Bourbon Sts.; plans furnished by W. H. Colwell, architect; mason's work, I. L. Horton; carpenter's work, Christopher Little; cost, about $7,000.

Rev. A. J. F. Behrands is having a dwelling built on Wesleyan Ave.; a two-story and gabled roof house, 40′ x 54′; mason, Henry Mason; carpenter, Wm. H. Wood; architect, Harris Angell; cost, $6,500.

RHINEBECK ON THE HUDSON, N. Y. — A school-house is to be built from designs of Messrs. Silliman & Farnsworth, of New York.

RIDDLESBURG, PA. — Designs for administration offices for the Nimrod Coal and Iron Company have been drawn by Messrs. Silliman & Farnsworth, of New York.

ROSCOMMON, MICH. — Preparations are making to build a small jail, with three cells, costing $2,000.

SACRAMENTO, CAL. — N. D. Goodell is the architect for residence for Daniel Brown, on L St., between Fourteenth and Fifteenth; cost, $4,000; for William Kleinsorge's two-st'y dwelling house, cor. Fourteenth and L Sts.; cost. $5,500; for Jacob Meister's wo-st'y residence, cor. Seventeenth and I Sts.; cost, $4,800; for C. A. Yoerk's residence, on H St., between Fourteenth and Fifteenth; cost, $5,500; and a stable for cost, E. Jacobs, J St., between Tenth and Eleventh; $3,400.

SAG HARBOR, L. I. — Messrs. Silliman & Farnsworth, New York, have drawn plans for a new church.

SPRINGWELLS, MICH. — Kurth & Co. have commenced a new building, adjoining their store, on the corner of Fort and Campau Sts.

ST. PAUL, MINN. — De Coster & Clark, whose shop and warehouse were destroyed by fire, May 16, will at once rebuild.

Lindekes, Warner & Schurmeir will build, at the corner of Fourth and Sibley Sts., a six-story store, 100′ x 130′.

STREATOR, ILL. — The new stores of Bilcher & Hatenhower are fast progressing, being built by the Streator Manufacturing Co.

There is some talk of a new church here this summer, for the Independent Society.

SUTHERLAND FALLS, VT. — A subscription paper is in circulation to build a chapel, and Gov. Proctor heads the list with $500.

THOMPSONVILLE, CONN. — A special town meeting, called to take action on building a new town-house in place of the old one recently burned, has voted in favor of rebuilding, and a committee, consisting of John A. Houston, Robert R. Morrison, C. O. King, Henry C. Woodword, Henry Abbe, Charles M. Abbe, and Edward Prickett.

TOPEKA, KAN. — Congregational church, Florence stone; cost, $15,000; B. J. Bartlett, of Des Moines, Io., architect; E. H. Homer, contractor.

WAYNESBURG, PA. — A new jail and sheriff's office for Chester County is to be built, the plans and specifications having been approved by the Town Commissioners.

WESTFIELD, MASS. — The corner-stone of the new Episcopal Church of the Atonement, near the corner of King and Washington Sts., was laid Saturday, May 15.

WINFIELD, KAN. — Two school-houses, of Cowley Co. stone; cost, $11,000; B. J. Bartlett, of Des Moines, Iowa, architect.

WOONSOCKET, R. I. — The Trustees of the Woonsocket Hospital Company are looking for a site to build upon. They are well agreed that when they build they will do so upon the cottage system. The accumulated funds amount at present to about $60,000.

The steeple of the Baptist church is to be rebuilt.

Industrial.

COHOES, N. Y. — F. S. Peters is building a new pulp mill.

DANBURY, CONN. — Lacy & Dunn, whose fur factory was burned April 1, have bought a site for a new and larger one.

LOWELL, MASS. — The Hamilton Company is beginning the alterations on the building, corner of Jackson and Central Sts.

MANCHESTER, CONN. — The P. C. Cheney Company are to erect a new building west of the present pulp-house. It will measure 48′ x 210′.

MONONGAHELA CITY, PA. — H. L. Ihmsen, Gregor Fox, John J. O'Leary, and James Beck, of Pittsburgh, will build a window-glass factory, and expect to have it ready the 1st of September.

PORTLAND, CONN. — The U. S. Stamping Company have begun another building in place of the one recently destroyed.

QUINCY, ILL. — The Quincy Paper Company is building a new mill.

ROCK MILLS, ALA. — F. B. Rankle & Co. are to build a new cotton mill.

SOUTH KEENE, N. H. — A new building, 150′ x 40′ is being erected, to supply the buildings recently destroyed by fire, belonging to the Keene Chair Company.

ST. LOUIS, MO. — The Excelsior Manufacturing Company intends to build another moulding shop, 72′ x 137′; cost, about $8,000.

H. S. Hopkins & Co. are about to erect extensive buildings near the Laclede Rolling Mills.

Bids and Contracts.

BALTIMORE, MD. — The directors of the Natatorium have contracted with Messrs. Bartlett, Robbins & Co., of this city, to line the entire pool with boiler-iron, a quarter of an inch in thickness. This is to be done to secure a perfect safety from any possibility of accident by breakage of the walls, like that which occured when the water was first turned on, about three weeks ago. The pool is 40′ x 140′, and a huge tank will be constructed and let down within the walls. The construction of the iron lining will be under the directions of Mr. Robert K. Martin, engineer of the Water Board.

DALTON, MASS. — Z. Crane, Jr., Bro. & Co. are to build a store-house, 24′ x 50′.

GREENSBORO, IND. — The contract for building the new jail has been awarded to Messrs. Harris & Thomson, of this city.

HOLYOKE, MASS. — John P. Taylor, of South Hadley, has the contract for enlargement of John Tilley & Co.'s two stores.

LYNN, MASS. — The Council committee has awarded the contract for dredging the channel and building a sea-wall and extending the sewer at the Public Landing, to A. W. Parker & Co. for $7,209.12.

MARSHALL, MICH. — Pauly Bros., of St. Louis, Mo., have the contract for the new jail of Calhoun County. The contract price is $24,650.

MIDDLETOWN, CONN. — The contracts for building the enlargement of the State Asylum for the Insane have been awarded. There were about 50 bids, and the successful bidders are pretty evenly divided between Hartford and Middletown, and but one contract goes out of the State. The Walworth Company, of Boston, will put in the heating apparatus. The largest contract, $52,557 for mason-work, goes to Watson Tyron, of Enfield.

MILLVILLE, MASS. — The contract for building the new mill for the Lawrence Felting Co. has been awarded to Mr. Patrick Conelly, of Woonsocket. The mill is to be 125′ x 44′, three stories high, and of wood.

NEW YORK, N. Y. — Messrs Johnson & Wilson have the contract for 500 barrels of cement, lately called for by the Deportment of Docks, and a similar contract for cement to be used on the Capitol at Albany.

The contract for the iron-work of the U. S. Barge Office has been awarded to Messrs. J. B. & J. M. Cornell, for $49,473.

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WE hope we may be pardoned for recurring to the dispute now pending between the Mayor of New York and Mr. Henry J. Dudley, Superintendent of Buildings for that city. Of the character of the Superintendent, or of the justice of many of the accusations against him, we know nothing; we do, however, find in the printed list of charges some that appear to us unjust, and in the comments of the daily papers on the case much that is glaringly unfair. The very first item of Mayor Cooper's charge against Mr. Dudley accuses him of having appointed as Deputy Superintendent one Robert McGinnis, a man rejected as incompetent by the Examining Committee of the New York Chapter of the American Institute of Architects. Turning to the report of the New York Chapter in the Proceedings of the last Convention of the Institute, we find that having been requested by Mr. Dudley to nominate candidates for the office of Deputy Superintendent, according to law, their committee had *recommended Mr. Robert McGinnis for the office.* Either the Mayor or the Secretary of the Chapter would seem to have made a mistake here.

THE next specification charges that the Superintendent has authorized the erection and alteration of buildings in violation of the provisions of the Building Act, and gives a long list of items. It is true enough that the specific accusations show violations of the statute, but as all architects who have practised in New York know, the letter of the statute is necessarily violated in many cases, where old walls are built upon, alterations made, and the like, and for this very reason the law expressly directs that "the Department of Buildings shall have *discretionary power to modify or vary any of the several provisions of this act to meet the requirements of special cases;*" and in another place, where the penalties for violation of the statute are described, "the Superintendent of Buildings is hereby authorized in his discretion, good and sufficient cause being shown therefor, *to remit any fine or fines, penalty or penalties, which any person may incur under any of the provisions of this act.*" It would be difficult to confer in more explicit terms the power for the exercise of which Mr. Dudley is arraigned. Whether his discretion was wisely exercised, is another question; undoubtedly it was not in all cases, but it must be remembered that extraordinary wisdom cannot be demanded even of those vested with the most absolute powers. The other specifications relate to "arbitrary dismissals," "private malice," etc., and are comparatively trivial. The whole list of allegations appears to us such as would be likely to be drawn up against any official of extensive relations and unbounded authority. Some of our best architects regard building statutes as seriously detrimental to the public interests, by shifting the responsibility of those who design construction upon an official department, where it is lost amid the dust and noise of politics; and it seems as if these things proved the correctness of their view.

THE Archæological Institute of America has issued its first annual report, whose modest appearance hardly indicates the value of the work which it has, within so short a period, already accomplished, or the ambitious character of its plans for the future. With only about a hundred and twenty members, and limited in resources to the scanty income derived from their fees and contributions, the Institute has nevertheless been able to increase the sum of archæological knowledge by an interesting report concerning some examples of Grecian architecture hitherto little known, by Mr. J. T. Clarke, whose contributions to this journal on similar subjects will be remembered; and an account of investigations made in the interest of the Institute by Mr. W. J. Stillman among the pre-historic remains of Etruria, a field for exploration second in interest to none in either hemisphere. Besides these substantial results of the year's work, a well-considered scheme has been formed for future operations. As is natural, the importance of the study of American antiquity has engaged special attention, and steps have been taken for sending out a properly qualified agent not only to gather in New Mexico and Colorado such relics of the early civilization of our continent as may be obtained, but to investigate the habits and traditions of existing tribes, with a view to the light which may thus be thrown on the problems which American archæology still presents. Simultaneously with this inquiry, it is proposed to conduct an exploration at a site in Greece, which has been selected, but whose position is not yet revealed. The spot has been chosen with care, and, judging from the wonderful success of recent researches at Olympia, Mycenæ, Troy and Pergamon, it is reasonable to predict most interesting results. The Committee, feeling that the prospects of the Institute now give them ample justification for so doing, appeal for an increase of membership, and for contributions of funds to carry out their proposed work. The sum needed is small, and we hope for their speedy success.

THE San Francisco Board of Trade, whose opinion on the subject is entitled to great weight, has, in a special report on the inter-oceanic canal question, declared emphatically in favor of the Nicaragua route. The report urges that the impost of three dollars per ton for toll by the Panama line will practically prevent its use in commerce to a remunerative extent, and claims that the Nicaragua canal can be built for one-half the cost of the other, so that a rate of toll which would not be remunerative in one case would pay good interest in the other; arguing furthermore that the Nicaragua route will save eight hundred miles over that *via* Panama in the distance between our Atlantic ports and California, a difference which would in the long run weigh heavily in favor of the shorter line. Some of the members of the Board are very familiar with the Isthmus, and assert that Nicaragua can furnish ample supplies and materials for construction, which are wanting at Panama, while the natural products of the region will of themselves offer an inducement to commerce to turn in that direction. In regard to the practicability of the cutting, a member asserts of his own knowledge that one can at certain seasons sail in a steamer from the Atlantic to within twelve and a half miles of the other ocean, to a point from which he can see the setting sun dip into the waters of the Pacific. This being so, it seems as if a hundred million dollars were a liberal allowance for excavating the remainder of the way, and the San Francisco Board believes that this is far in excess of the sum which will actually be required. Considering that a single one of the new Broadway rapid transit companies expects to spend about fifty millions on its road and branches, the inter-oceanic canal begins to seem a less formidable undertaking than it did at first.

THE financial success of the New York elevated railroads seems to have stimulated afresh those capitalists who have long looked with desire upon the preëminent advantages which Broadway offers as a route for rapid transit to undertake some definite scheme, and the prospect of accomplishing the result they wish seems now particularly hopeful. It has often been reported that the property-owners on that thoroughfare, finding their rents depreciated by the transfer of business to the Sixth Avenue and the Bowery, through which the elevated roads run, were disposed to promote the construction of another elevated line through their own street; but from the comparative narrowness of Broadway, it is doubtful whether the obstruction by the track would not cause more injury to property than would be compensated by increased facility of access, and the subject seems to have been dropped. Lately, however, it has been revived in a modified form, two rival companies having applied for charters, one for an elevated road from the Harlem River through Madison Avenue to Ninety-ninth Street, thence under

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ground through Broadway to the Battery; the other for a line wholly underground through Broadway and the Boulevard to King's-Bridge. The expense of the tunnel road is estimated at about two million dollars per mile, this enormous cost being due principally to the tough and hard character of the rock which underlies the city throughout almost its whole extent, and in which the greater part of the route would have to be cut. The experience of the elevated lines shows, however, that the road would pay interest on even this immense outlay.

A card has reached us signed by a well-known sculptor, Mr. T. H. Bartlett, announcing the formation of a school for instruction in sculpture and modelling at No. 394 Federal Street, Boston, where all who wish may study and practice the art. The rooms are open day and evening the year round, and instruction is free to those who are unable to pay for it. The modelling of terra-cotta and similar materials will receive special attention, and the course of study extends even to the glazing and burning of pottery. Mr. Bartlett's opinion is, that these materials are to occupy an important place in the arts of this country, and that there is already a widely-felt need of instruction in their use. Without quite agreeing with him in his anticipations as to the future extension of the use of terra-cotta, we nevertheless anticipate much good from Mr. Bartlett's school. The study of form is quite independent of material, and those who can model well in clay need little further instruction to make them good designers, and what is not less useful, good critics, of work in stone or metal. Indeed, we may expect great good to the art of architecture itself from any increased knowledge or perception of form; for a taste once cultivated to the appreciation of beautiful sculpture will be the first to be offended by the disproportioned clumsiness of bad architecture. Much is to be anticipated in the future from the remarkable interest in plastic art which has been developed among us within a few years by the efforts of a few individuals. The very children in the kindergartens are now very generally taught to model in plaster, and opportunities are provided for the ample development of faculties so early awakened. No doubt the results for which preparation is thus so effectively making will not be long in making their appearance.

Some time ago the Conservators of the River Thames, alarmed by the alleged silting up of the channel of the river, through, it was said, the deposition of sediment from the sewage poured into it below the city of London, and brought back by the tide, demanded from the Metropolitan Board of Works, in whose charge the sewers are placed, the removal of the deposit, if such existed. The matter was referred to two arbitrators, Captain Douglas Galton and Mr. F. J. Bramwell, with Sir Charles Hartley as umpire, and a unanimous opinion has just been presented by them, to the effect that the injurious deposits have not taken place to the extent supposed; that while certain banks have been formed, the main channel has been deepened, and that this effect is due to dredging operations, undertaken by the Thames Conservators themselves, near the outfall of the sewers, which have changed the character of the flow, increasing its velocity and scouring action in some places while it diminished it in others. Of the sediment which the water undoubtedly contains they report that a part consists of sand and mud scoured from the river-bed, and part from the drainage of other cities and towns: a small portion may be derived from the sewers of the Metropolitan Board, but the amount is so small in proportion to the whole, that these sewers cannot in any sense be said to have caused the deposit, and the Board of Works should not be called upon to remove, or pay any part of the expense of removing, the banks in question.

A question of considerable importance to builders has been decided in England lately. One Mr. Davies had contracted for alterations to his house in London, and while the works were in progress the builder took thirty loads of sand from the garden for making mortar, afterwards filling up the holes with rubbish. On discovering this, Mr. Davies sued the builder for ten pounds, the value of the sand, and thirty pounds more as damages for injuring the ground by the bad quality of the rubbish with which the holes were filled. The defendant claimed that he had a right to use the sand from the garden, and that the plaintiff not only consented to its removal, but paid him (under the contract) for digging it up and using it. The judge, however, refused to listen to the defence, and remarking that it was unreasonable to believe that the plaintiff consented and intended to pay for having his garden so damaged, gave judgment in his favor for the value of the sand. It is so common for builders to dig for sand to make mortar at the site of the works wherever practicable, that this decision should be remembered. The custom seems to be that where good sand can be obtained from the excavation for a building, the contractor may use so much of it as he needs for mortar, unless some other understanding can be proved; but in the absence of any agreement it cannot be expected that an owner should be forced to submit to having holes dug at random over his premises. As the difference in cost between digging sand from the site and buying it outside amounts in most cases to a considerable sum, it is very desirable for all parties to come to a mutual understanding beforehand.

M. Emile Trelat, who is well known as a writer on various points of what may be called practical architecture, makes, in a recent address, some suggestions in regard to the lighting and ventilation of school-rooms, which are interesting, and in some respects novel. He advocates strongly the lighting from one side only, which has already been recognized in Germany and England as the best arrangement for the eyes of the pupils, and proposes to gain the required amount of illumination by increasing the height of the class-rooms, and making the windows as lofty as possible. He considers that in order to gain steadiness of light, all the windows should face the north; thus there will be no need of shades or blinds. Nevertheless, he does not forget the necessity for sunshine and cross currents of air through rooms to be occupied by children; but believing that both of these are unpropitious to the school work, he would provide openings in the south wall, opposite the windows, closed by shutters, and at regular intervals in the school day he would have the pupils sent into the playground, and the shutters and windows thrown wide open, flooding the room with sunshine and fresh air, sweeping away the gathered effluvia which a gentler aëration might not be able to dislodge, and filling the room with a new and sweet atmosphere into which the children can return from their "bath of fresh air," as he terms it, without any sensation of closeness. These observations, proceeding from such a source, are worthy of careful attention.

A difficulty which probably many of our readers have encountered, often arises in computing the cost of a building, upon which the architect bases his charge, when a part of the materials are furnished by the owner. There is such a misapprehension of the nature of an architect's labors that many proprietors maintain, if they make their own contract for a furnace, for instance, instead of trusting their architect to make it for them, that the latter ought not to charge commission on the cost of it, whereas nine-tenths of the care and labor on his part, which the use of a furnace involves, consists in the planning and arranging for passage of hot-air pipes and location of registers; the actual receiving of estimates and signing of an agreement being a trifling matter in comparison; and so with many other details. In general, the architect must have in mind, and shape his plans, almost from the beginning, in accordance with all the minutiæ which he understands are to enter into the final result, often with an amount of care and thought quite disproportionate to the trifling addition which a percentage on their cost makes to his commission, and it is clearly unreasonable to claim that he is not entitled to payment for his trouble unless he happens to be charged with the actual purchase of the articles for whose reception he has been obliged to make all the preparations. To make the point clear, a thoughtless or unreasonable client may be asked whether he would claim that if he furnished all the materials the architect would not be entitled to any pay at all.

We have received the Report of the Boston Fire Commissioners for the year ending May 1st, 1880, containing much interesting matter. Every fire occurring in the city is described, and the cause, loss and insurance recorded, with other details. The total losses by fire for the year have been a little over a million and a quarter dollars. We are surprised to find how small a proportion of the losses are covered by insurance. It is true that most of the fires are trifling, and even a partial insurance on the building and its contents is sufficient to cover the damage they cause, but in the extensive conflagrations, causing total destruction of the building and contents, it appears that many of the parties interested had only one half, or less, of their risk covered.

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THE VENTILATING FIRE-PLACE.[1] — III.

IN Fig. 181, the fire-place opening is shown closed with doors of soapstone decorated with incised carving. The writer has not, however, tried these doors on account of the difficulty of constructing them. They form no necessary part of the apparatus and are offered merely as suggestions. They are here divided into three panels; the lower two slide to the right and left in slots shown in Fig. 182. The upper panel rises like a window-sash, and when open takes the position shown in Fig. 189. It is hung by chains running over pulleys and balanced by weights, after the principle of the "Lhomond" blower shown in Figs. 60, 61, 62, 83, and others. The object of this arrangement of doors is twofold. It allows the fire either to be enclosed at night for safety by shutting all three doors, or it allows it to be increased in activity by opening the lower two doors and using the upper one after the manner of the "Lhomond" blower. These doors are designed to be made of soapstone in order to render them more air-tight than is possible with metal under great changes of temperature. The edges are tongued and grooved to fit nicely into each other when closed. Elastic strips of thin brass might fastened to the facings to increase the tightness by bearing against be the soapstone doors, but it is not probable that the advantage thereby gained would justify the extra outlay, inasmuch as even with them a sufficient degree of tightness could not probably be attained to arrest combustion and keep the cinders alive over night. Were this possible these dampers would be of the greatest value. As it is, their chief object is security against fire.

We can also have the same device in another form. The panels are in this case made of mica-slate set in a sculptured soapstone frame. The mica-slate becomes blackened by smoke in the course of time, but it may be readily cleaned or replaced by new. The effect of the fire behind them is very pleasing. The drawing is taken from the writer's dining-room except that the soapstone blowers have not been constructed. Inasmuch as the dining room fire-place is rarely used, the smoke-flue is left simple. The lower part is, however, made of terra-cotta drain-pipe which passes through the air-chamber in a straight line to the floor of the room above and then enters an ordinary brick flue. It thus forms a Galton flue. The free space in the chimney-breast by the side of this flue is occupied

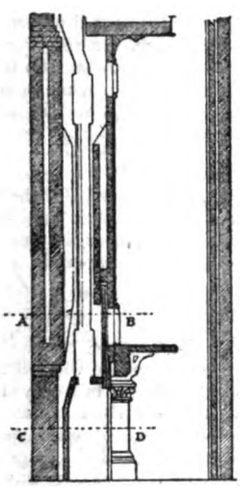


Fig. 190.

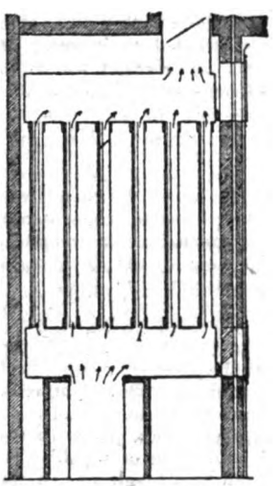
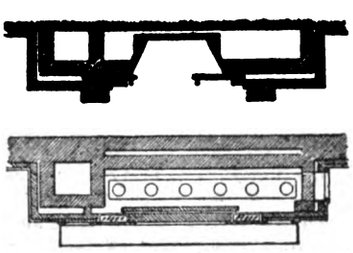


Fig. 191.

Fig. 201.



Figs. 192, 193.

by an iron distributor like that shown in Figs. 188 and 189, connected with the smoke-flue of the kitchen range below. In the chamber above, the same flue passes through another similar iron distributor, so that a large enough proportion of the range heat is saved to heat and ventilate both rooms without injury to the draught.

It may be sometimes convenient to draw the fresh air from the room itself instead of from the outside, when small fires are burned in the fire-place at irregular intervals and insufficient heat is generated in the distributor to raise the temperature of the outer air to the required degree. But this should only be done when the fire-place draught is supplied from the warm-air flues of a furnace. Where no furnace is in use in the house the air taken across the distributor should always be drawn from the outside. It will otherwise come into the house unwarmed through chance cracks, and the result will be that exactly that amount of heat which it could otherwise have abstracted from the distributor will be lost.

A hinged panel in the chimney-breast may be decorated with an oil painting and protected on the back by tinning. The entire wooden front of the chimney-breast in this case can be made to take down, by removing the four large screws or bolts at the right and left corners of the mantel-shelf and under the brass warm-air registers at the top. On the right and left are two sideboards, in connection with one of which, the lower square pipe of the distributor serves as a plate-warmer. Where two fire-places built over each other in the same stack are both likely to be used, but seldom at the same time, the same distributor may be connected with both of their smoke-flues in the manner shown in longitudinal section in Fig. 190. When one of the fires is in use it is only necessary to close the damper in the throat of the other. But both fire-places may be used at once because they have separate flues above the distributor. One of the flues may be the range-flue, and the Fig. 190 gives the distributor actually designed for the fire-place and range (though not so constructed). Fig. 191 gives the transverse section of the same fire-place and chimney-breast. The soapstone blower is shown in this section. Fig. 192 gives a horizontal section of the distributor and of the hinged and movable panels. The brick wall is vaulted behind the fresh-air space for the preservation of the radiated heat.

We see by the section (Fig. 189) that the back of the hinged panel is furred out in such a manner as to bring the tin-work close up to the perpendicular pipes of the distributor, just above the lower horizontal pipe. The object of this is to direct the rising current of fresh air against and between these upright pipes. Half of the success of the apparatus depends upon the care taken in setting, so that the fresh air shall be forced to strike every part of the heating-surface. To prevent loss of heat by the radiation of the pipes upon each other, thin strips of sheet-iron should be placed between them. This greatly increases the heating-surface.

By referring to the historical division of our subject, we shall see that the peculiarities and advantages of many of the ventilating fire-places and hot-air furnaces described have been brought together in a single apparatus.

The principle of the sloping jambs of Gauger and Rumford (Fig. 36) has been respected in the form of the fire-place itself. The fresh-air supply of Savot and Gauger at the back (Figs. 29, 30 and 34) is represented in the lower register behind the fire-place. The two-way valve (Fig. 38) may be used to regulate the admission of the fresh air from the outside, or from the room itself. The caliducts or meanders of Savot and Gauger (Fig. 37) are reproduced in a simpler

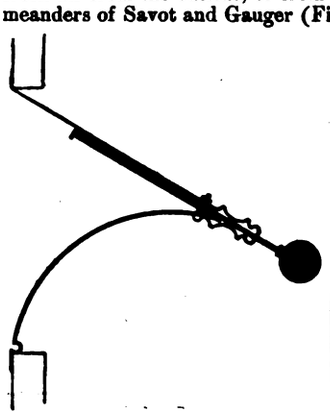


Fig. 194.

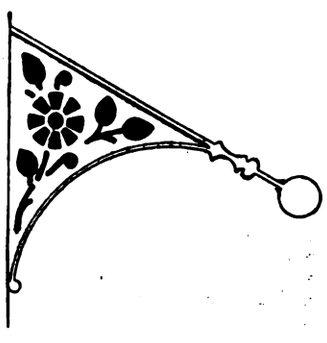


Fig. 195.

form in the "distributor" pipes. The contracted throat of the fire-place, the bevelled back and its rounded upper edge, and the non-conducting, heat-radiating linings of Rumford are found in the form and material (soapstone and tile) of our fire-place; the "soufflet" of Lhomond (Fig. 60) is given in the soapstone blower. The movable grate of Bronzac (Figs. 62 and 63) is or may be retained. For the inverted smoke-flue of Desarnod (Fig. 65) and Montalembert (Fig. 66), of Douglas Galton (Figs. 67 and 68), of Descroizilles (Fig. 69), of Peclet (Figs. 70, 71, and 72), we have substituted the simple conical damper in the upright flues, and obtained results equally good without danger of smoke or clogging. The advantages of the Taylor fire-place (Fig. 73) are retained in the use of terra-cotta, while its disadvantages are avoided by placing it where it can easily be reached for cleaning or repair. The further improvements of Leras (Fig. 75), Fondet (Figs. 84 and 85), Cordier (Figs. 86 and 87) and others, in the use of a direct smoke-flue with circulating fresh-air current, have been adopted in the upright pipes and meandering air-passage, and in the manner in which the fresh air is brought in contact with the distributor by the sides of the air-chamber and the tin linings. The principle shown in Figs. 80, 81, 82, and in the fire-places of Joly and Galton (Figs. 100, 101 and 103) of the increase of heating-surface by the use of iron plates intercepting or conducting radiant heat, has been followed in the use of the iron sheets placed between the upright radiating pipes. The principle of placing the heating-surface above the mantel, and of increasing it by extending the smoke-flue at this point (Fig. 125) is developed and carried to its utmost limits in the form and duplication of the dis-

[1] This paper, by the writer of the Open Fire-Place articles, will be incorporated with them in their separate form.

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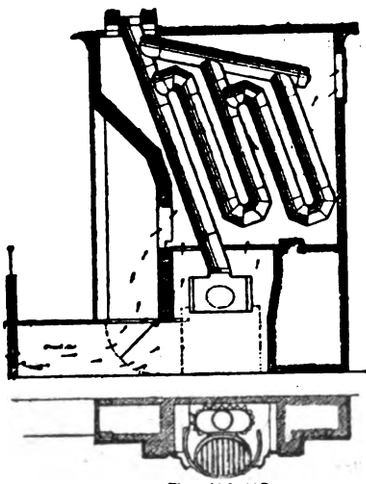
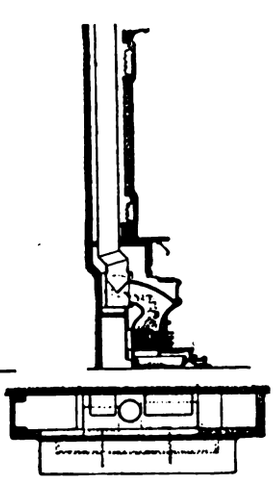
tributor. The principle explained in connection with Fig. 129, by which all the heat of the smoke may be obtained without destroying the draught, is employed to advantage. Finally, the extended heating-surface of a basement furnace is emulated. The simplicity of the MacGregor or Magee drum furnace (Fig. 132), the durability and tightness of the soapstone (Fig. 144) and terra-cotta furnaces (Fig. 143), the increased heating surface obtained by the use of separate pipes (Figs. 133, 134, 140, 141, and 142), are sought. The distribution of the smoke is accomplished with the minimum of friction and cost, and withal, the artistic treatment of the fire-place and mantel is unobstructed.



Figs. 196, 197.



Figs. 198, 199.

Any one of the ventilating fire-places described may be used in connection with it, and, by the combination, the maximum of effect may be reached in the minimum of space.

The heat of the fresh air rising from this combination with the Jackson fire-place, in the library of the house on Marlboro' Street, mentioned above, was so great as to affect the carving on the frieze of the black-walnut mantel. To provide against its destruction, the writer designed the cut brass hood shown in Figs. 194 and 195, to deflect the current of hot air from the woodwork.

The writer has also used the "Fire-place Heater" in connection with his distributor in the manner shown in Figs. 196–200. The form of distributor here used is objectionable on account of the reversed draught, but it is less expensive to make than any other form. The chimney in which it is used having a powerful draught, it never smoked. With an ordinary draught, however, it might be troublesome, and is not to be recommended. The lower two elbows are made to slip off for the purpose of cleaning out the pipes when necessary, but their removal will probably be attended with difficulty as soon as they become a little rusty. A damper is placed at the top of the first and third upright pipes where shown in the cuts, to direct the smoke through more or less of the pipe.

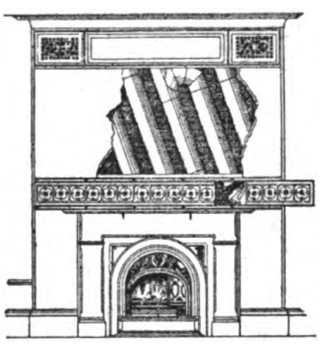


Fig. 200.

Fig. 201 gives this kind of distributor in a slightly more compact form, but open to the same, if not greater objections.

OLYMPIA.[1] — III.

The passage to the side aisles seems from a sinking in the stylobate of the interior columns to have been restricted to one intercolumniation, — that between the first and second shafts from the door, the space between the first and the wall being taken up by the wooden staircases which led to the galleries. The pteroma and part of the naos had a pebble cement floor; that of the side aisles consisted of several layers of stucco. The pronaos and epinaos had more costly pavements; that of the latter being of black marble slabs, that of the former the mosaic so well known from the Expédition de Morée and from Semper's Stil.[2] This has suffered so much since its first discovery, fifty years ago, that it was impossible to make a complete drawing of it. The material of which the temple was built is a limestone shell conglomerate. The little marble that is used — for the cyma with the lion masks and for the roof tiles — is from Paros. Where Pentelic marble appears it is generally attributable to an extensive restoration which affected the building at a late Roman date. The inexpensive and almost mean cement pavements, which must have taken the place of worn marble blocks, seem also due to alterations of that period. As in most Greek structures, the walls were commenced by a course of extra height, large stones placed on edge, upon which followed the narrower layers. The height of single drums of the pteroma columns varies greatly, an economy which may well be excused as the channeling, the fine priming of stucco and the *bapoe* rendered the joints and the differences in color of adjoining stones entirely invisible. There are few traces of the doorway arrangement; two pivot-holes and a bolt-slot in the threshold make it probable that the door opened outwards. The details of the elevation are not yet thoroughly published. The trigylph frieze over the ends of the cella is not continued around the sides, being terminated by a return. Traces of color are mentioned as distinguishable upon its entablature; the ornament of the cyma is particularly distinct. The staircases, the ceilings and roof-trusses were of wood; they have left heaps of ashes in different parts of the interior, as well as the beddings in blocks of the masonry which witness their existence. It is hardly necessary to add that no traces of a hypæthron have been found in any of the temples of Olympia. The execution of the stone-work is excellent, the connection of the separate blocks by iron dowels and clamps cast in lead is effected with great care. The excavations of the third year brought to light a well-preserved metope, with traces of stucco which distinctly show the former attachment of a shield; the diameter of this was 1.03 m. As the metope was the eighth from the east upon the south, it is concluded that eleven of the celebrated shields of Mummius were attached to the southern side, the remaining ten finding place in the metopes of the principal front. The exact dimensions of the plan, and to a great degree of the elevation, are now certain. The attempt of Herrn Dörpfeld to calculate the exact length of the Olympic foot and stadion from proportions and commensurable dimensions supposed to be recognized in the buildings of the Altis, seems to the writer, notwithstanding the great space which is officially devoted to it, to be only a new speculation upon a tempting but thoroughly fruitless field. The results which are obtained are in this case not even striking coincidences; they will not be accepted as proof by designing artists who are with right sceptical that arithmetical relations can possess a subtle influence upon the beauty of their work, and object to having this rendered so easy and schematic for them. Such systems of proportions and commensurable dimensions, interfering as they do with artistic composition, and rendering no advantages in return, should be looked for last in the rational architecture of the Greeks, calculated as it was, above all others, for the eye of the beholder. The Heraion was a peripteros of six by sixteen columns, with nothing abnormal in plan, it being upon the same scheme as that which appears in the temple of Zeus, near by, and in the temples of Ægina and Pæstum. The suggestion in the former notice, that the unusual number of the side columns, which does not elsewhere occur, stood in some symbolical relation with the sixteen maids of Hera, for whom the temple was built, who here held their festivals and represented the sixteen cities of Elis, at that time in existence, may perhaps gain weight, in as far as the futile question is worth arguing, by the discovery that the columns within the naos were also sixteen in number.

The stylobate consists of only two risers. This will go far to overthrow the supposition that the distinction between the temple of a divinity and a heroon was indicated by the number of steps. The ascent to the ptemora, which must have been crowded with statues and offerings, was not allowed at either of the fronts, but only through the corner intercolumniations of the southern side. The epinaos was provided with a *grille;* its two columns, one of which was said by Pausanias to be of wood,[1] have disappeared, their place having been taken by a rough mass of masonry, as the epinaos was at one period used for a wine-press. The elevation of the temple shows some very remarkable peculiarities. The building seems a curious patch-work of various ages, frequently restored after completion. The columns are of most different forms and dimensions; their diameter ranges between 1.00 and 1.29 m.; the distance between their centres is also varied; a greater irregularity can hardly be imagined. One of the shafts has sixteen channels, the rest twenty. The capitals, their abaci, rings and incisions are of the most dissimilar design. The drums vary in height from .50 to 2.40 m.; the sides of the abaci from 1.31 to 1.75 m., as each echinus has a different inclination. Of the forty columns of the pteroma, only eighteen have been discovered. There seems absolutely to be no two of these alike. The only two of which all the drums were found are published side by side, upon Plate 34, with eight other capitals; all are as different as possible. This peculiarity of the columns, which is not known to occur elsewhere, is puzzling. It is hardly probable that a gradual restoration of the building is answerable for all the varieties. The shafts appear not to have inclined inwards — even the customary contraction of the corner intercolumniations has not been cared for, and the metopes above them must consequently have been very much wider than the rest. Perhaps the adoption of the corner openings as a passage may have been to some degree accountable for this. Some slight pains have been taken, however, to hide the variation of their diameters. The exterior peripheries, not the centres of the shafts, are placed in line. Upon the northern side, which, standing next to the hill, was generally hidden from view, even this precaution was omitted, and the columns of the pteroma perform a most irregular dance. A still more remarkable peculiarity is that not the slightest fragment of the building's architrave (one

[1] Die Ausgrabungen zu Olympia. III. Uebersicht der Arbeiten und Funde vom Winter und Fruehjahr, 1877–1878. XXXVIII Tafeln, herausgegeben von E. Curtius, F. Adler und G. Treu. Berlin: Verlag von Ernst Wasmuth, 1879.

[2] Der Stil in den technischen und tekonischen Künsten, von Gottfried Semper. München. Bruckmann: 1788. Band I. Die Textile Kunst. p. 57.

[1] Paus. V. 16. 1.

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hundred and thirty-seven metres in length) has been found. It would be explained by the supposition that the entablature was of wood; but this seems very improbable and does not agree with the scamillus upon the summit of some of the abaci. The execution of the existing stone-work is good; the material is for the greatest part poros, primed with a fine white stucco like that of the great temple of Zeus. A peculiarity of the antæ of the pronaos and epinaos is that they were formed of some thin material, clamped to the cella wall, possibly of marble, or even of wood, coated with bronze; the roof-tiles are of terra-cotta. The pavement of the interior consists of rough limestone slabs, brought to a surface with cement. The columns within have left traces upon this, which measured .88 m. in diameter; this argues them to have been of the Ionic style. Fragments of Ionic capitals found in the naos, and the fact that the pedestals of statues stood in the usual situation of staircases, makes the adoption within of a dual system without galleries almost certain. As the details are of a very debased character, and as remains of Doric shafts and capitals have been found which fit, in general dimensions, to the interior of the temple, the theory of Adler, that a hyperoön of the Doric order was displaced during a restoration of the late Roman period by tall Ionic shafts, seems plausible. There is much in the character of the building which shows that the ruins known to us are not of great age. There is a certain formal regularity of plan, an inartistic dependency of the cella upon the peripteros, which never occurs in Hellenic structures. The naos is exactly in the middle of the plan; though the pteroma before the pronaos is somewhat broader than that at the rear, the difference is exactly equalized by the pronaos being curtailed in depth, with unhappy effect. It is plain that the correspondence of the lateral axis of the interior columns with that of each of the central eight of the side

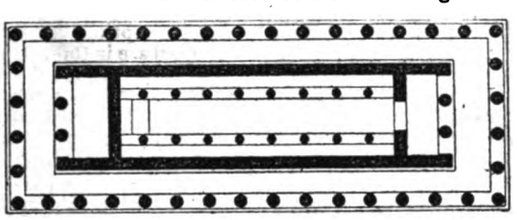

Fig. 2. Plan of the Heraion.

peripteros was the natural result of this central position of the cella, and had no further significance. All that speaks for the great age of the Heraion is its extreme elongation; this must have been retained through a number of rebuildings. It appears to have been intended that the upper steps of the temples of Zeus and Hera should be of the same height. The levels of the western fronts are exactly equal; the eastern fronts differ slightly from the normal horizontal plane, that of the Zeus temple being .05 m. below, that of the Heraion .17 m. above it.

A section through the foundation of the Metroön is given upon Plate 38, which shows little else than its breadth and position close to the terrace upon which stood the treasure-houses. Constructed of the same material as the other buildings, it was apparently erected at a late date, and disfigured by rough restorations. At the time of Pausanias it contained no statue of a divinity, but was filled with the portraits of Roman emperors.[1] The state of ruin in which it now remains is so complete that nothing can be surely recognized of its structure beyond the detail of the entablature upon Plate 38. Only one column remains upon the three steps of its stylobate. From the relative dimensions of these, it has been concluded that the scheme of the peripteros was six by eleven. This proportion is that advocated by Vitruvius,[2] and does not occur elsewhere in Greece or the Greek colonies; it does not bespeak great age. The Philippeion was the treasure-house which Philip II. erected, to protect the offerings dedicated by him to Olympian Zeus, after the victory of Chæroneia, over the Thebans and Athenians, and the expedition into the Peloponnesus, against the Lacedæmonians, had rendered all Greece in effect a province of Macedonia. The date of the erection of the building is thus quite surely referred to 337 B. C., between the time of the battle and the diversion of Philip's attention by the projected attack upon Persia. The king doubtless took pleasure in reminding the Greeks who annually crowded to Olympia of his supremacy. The commemorative thesauros with the chryselephantine statues of Amyntas, Philip, and Alexander, was not placed upon the terrace with the others, but was erected in a novel form upon the most conspicuous spot that could be chosen, — near the southwest corner of the Heraion, where it bordered the open expanse of the great altar, the chief place of the Altis. It was close upon the passage between the Heraion and the Pelopion which led from the northwestern entrance-gate to the altar and agora. The

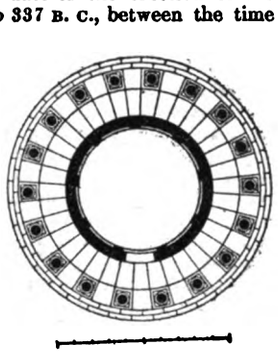

Fig. 3. Plan of the Philippeion.

first discovered were only two concentric rings of foundation-masonry. Little by little the fragments belonging to it were collected, finally sufficient to justify the restoration of plan and details. The building was a circular peripteros upon three steps, the pteroma of eighteen Ionic columns, the interior with nine engaged Corinthian columns. It appears to have been the first Ionic structure of the Altis. No remains of the door architrave or jambs have been found, but its opening was probably upon the south of the cylindrical cella. The foundations were laid with especial care. The rings consist of thirty-six radial stones, in one course for the inner substructure which supported the wall, in three courses for that of the pteroma. The cella itself was, as Pausanias says,[3] of brick, but no remains of its material have been found. The stylobate was of Pentelic marble, ornamented upon the treads and risers by rough raised faces, and filleted upon the outer and inner angles. The columns and entablature, up to the cyma, are of poros with the usual priming. The profile of the bases is graceful; the shaft has twenty channels; the capitals are plain, without necking, astragal or sculptured echinus. They are

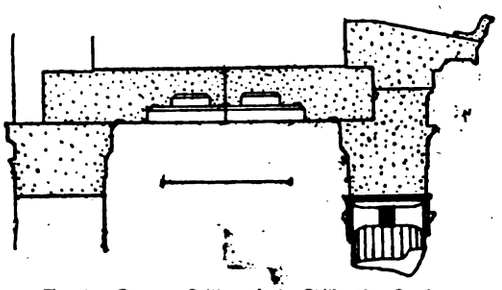

Fig. 4. Pteroma Ceiling of the Philippeion Section.

worked to a square plan, the parallel sides thus varying from the axis of the building, a want of care which is the more felt because of the shortness of the radius of the entablature curve. The Corinthian columns of the interior are not published in the third volume; their existence is known from a later report. They are said to be with four rows of leaves, the axis not marked by flower or palmetto, and to compare unfavorably with the contemporary Corinthian columns of the Monument of Lysicrates, — as might be expected from the comparison of any Olympian and Athenian works of architecture. The double-beamed architrave and the low frieze are of one stone, the bed for the stone ceiling of the pteroma being cut at the height of the frieze. The coffered blocks of the ceiling, though this does not have a greater clear span than 1.70 m., are strangely enough formed of two blocks which meet with a joint in the middle of the pteroma and depend for their support upon the bedding between architrave and cornice of the exterior entablature and upon their hold in the cella wall. The curve of the plan renders this a trifle more secure than it would be if the peripteros had been straight, but the stones must still have been in a great measure held in position by the principle of the arch. The side-thrust thus developed would react from the firm circular cella wall entirely upon the surrounding entablature, which was ill-fitted to bear it and the additional pressure of the roofing timbers and tiles in the same direction. The adoption of so faulty a construction is inexplicable. The ceiling beneath is ornamented by deeply-cut rhomboidal *lacunæ*. Prof. Adler suggests that the cella wall was continued up above the pteroma as a clerestory with windows for lighting the interior; but this seems improbable: a double roof was hardly necessary upon so small a building.

J. T. C.

[1] Paus. V. 20. 9.

[2] Vitruv. III. 3.

[3] Paus. V. 20, 10.

ST. MARK'S: ITS CONSTRUCTION AND PRESENT CONDITION.

HOWEVER decided may be the opinion which any reader has formed, and even as he thinks finally formed, on the question of St. Mark's basilica, we beg to assure him that he will be repaid with interest for the time which he may devote to learning what M. Charles Yriarte has written, in the last number of the *Revue des Deux Mondes*, on a subject which has brought English architects and archæologists to the fore, among the lovers of art and of science in Italy and in France, in an unusual and unexpected manner.

Before entering into the comparison between the actual and the original state of such a monument as the Church of St. Mark, it is necessary to recall to mind the special circumstances under which it was founded. In Venice we behold a unique city. All the ordinary conditions under which the architect works are there changed. The soil is composed of eighty islets soldered together by the industry of the Venetians. The decoration is that of an immense theatre, of which the stage is left empty; and which we fear to see vanish from before our eyes, as if by the shifting of a theatrical scene. Below the visible stage is a series of mechanical contrivances. Few of the foreigners to whom Venice is best known have ever realized the remarkable spectacle of the subterranean passages which exist among the piles and the immense pontoons which actually support the Church of St. Mark and the Ducal Palace. Nor is this question one indifferent to the architect. For him, when he is called on to build, the nature of his foundation should be his first care. The

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whole system of an edifice should be regulated by a just appreciation of the degree of resistance that is offered by the basis. It is the special condition of the foundation on which the architect has to rear his work at Venice that has given its special stamp to the architecture of that magic city.

The Church of St. Mark has no foundations, in the ordinary sense of the term. It is not that the soil is so mobile as to offer no appearance of solidity, but that there is a certain elasticity with which it is indispensable to reckon. The level of the lagoon is very nearly that of the soil of the great "Place." The tide has its daily rise and ebb, although they are small compared with those of the ocean. During winter, if strong winds coincide with spring tides, the Piazza San Marco is covered with a shallow and temporary lake, over which the gondolas can glide without danger. Thus the soil which for nearly 900 years has borne the weight of the Church of St. Mark is subject to unusual causes of disturbance. The result is one of the most curious monuments ever raised by human hands. The method of the foundation of the basilica is not the same as that of the Ducal Palace, which rears its façade close to the Bridge of Sighs. From the date of the first great buildings, by the Doges Participazio, Orseolo, and Domenico Contarini, down to the embellishments decreed by the Grand Council in 1422, that is to say, during five centuries, they have adopted at Venice a system of latticed platforms formed of enormous timbers. After 1422 the system was modified. First they drove piles, and then fixed sills and beams on the pile-heads, filling up the spaces between, where the water remained as if in so many vats. The produce of whole forests in Istria, Dalmatia, and Friali lies at this moment beneath the soil of Venice. The bare aspect of many of the Alpine mountains is due to the fact that they have been stripped, for a thousand years, in order to consolidate the soil of Venice. Time has done its work. Piles and sills cannot resist forever the action of tides and of stagnant water. Little by little the made ground has become permeable. Its level sinks, and as the settlement is not uniform, because some portions of the timber-work resist longer than others, the monuments of Venice are in visible danger.

So much for the soil. But another important condition is a disastrous result of this primitive peculiarity. That is, the system of construction of the mass of the edifice. If it is not exact to say that the monument is Byzantine, it is yet undeniable that the system of the Oriental builders has been followed by those of St. Mark. They have not, strictly speaking, made walls for their building, but simply partitions or closures, in order to avoid the settlement of large surfaces. Adopting for all the parts which enclose the area a system of arcades, of archivolts, of cupolas, of vaults, and of niches, they have accumulated all the weight of the superior construction, and all the thrusts of the arches, on massive pillars, deeply founded on piles. Once assured of enough resistance to support these pillars, they had no fear of settlements over the perimeter of the building. When it is added that marble has served for the springing courses of brick arches and archivolts; and that when, for the purpose of decoration, marbles of great value and high cost have been employed, they have been applied in thin laminæ, attached by cement to stone plaques, it is easy to see that any attempt at restoration must encounter almost insurmountable difficulties. The decoration of St. Mark is not an embroidery of the tissue, but a facing of the surface alone. What is technically termed, by the French architects, the "*Reprise en sous-œuvre*," an operation which is simple enough if the beauty of the monument is inherent in the mass (whether of stone or of marble), is no longer possible when there is nothing to repair and support but a mass of crumbling bricks, and a casing of thin plates of marble disconnected from their supports by the movement of the structure, and by settlements which have shelled them off from time to time. Here must be mentioned the difficulty which opposes the replacement of these plates of marble by similar materials. Even if the same quarries were worked, which is hardly to be expected, there would no longer be seen the rich *patina* which now covers the time-worn surfaces. Time has been the fellow-laborer of art in producing that perfect tone which is one of the chief glories of Venetian architecture, and it is altogether idle to look to science or to art to produce a like effect without the indispensable aid of time.

There could have been but one system adopted to prevent the irreparable damage which the studious observer of St. Mark's Church has now to lament; that is, the careful and uninterrupted maintenance of the building from the date of its foundation to the present time. It is hardly necessary to indicate the historic reasons which have led to a long neglect of the exterior of the basicila, and which explain the mode in which parts of the interior have been dealt with. The Procurators of St. Mark, once so jealous of their rights and their authority, found themselves, at the decline of the institution, without credit, without prestige, and without resources. How many causes of decay may be enumerated without including invasions and actual catastrophes? For how many years has the famous decree of 1500 been a dead letter? *Non si possi mai in alcun tempo far rompere opera alcuna in alcuna parte di essa chiesa senza la presenza del Procuratore del chiesa.* No work shall at any time be executed in any part of this church without the presence of the Procurator of the church. The framers of that excellent law seem to have had a prophetic fear of the work of the restorer, and a sense of the truth that it was only to the corporate tradition of living guardians that the safety of the edifice could be entrusted.

The especial mischief, in the case of any substantial repairs to a building of this nature, is the entire destruction of that general harmony of the monument which is the result of the action of time, of the effect of the atmosphere, of the hygrometric conditions of the locality, and of all those natural combinations of tint and tone which have produced themselves on the surface of the edifice, especially in a climate like that of Venice.

Suppose, now, — and it is the case in many parts of the basilica of St. Mark, — this covering to have scaled off; and after having been, for more than a century, held together by iron cramps let into the brickwork, to be losing its cohesion, — how is it to be replaced to-day? The *Marmorata* of the Tiber, no doubt, has been discovered. But this is not enough. Caneva, Sacile, Carrara, Verona, and the quarries in the neighborhood of Florence offer marbles of splendid names: the translucid white, the alabastrine white, the straw-colored veined with gold, the flower of Venus. But these cannot replace the *pavonazetti*, brilliantly spotted like the tail of a peacock, which the builders of Venice brought from the East. If the absolute necessity arises to replace a part of the *revêtement*, there is an end of the *patina*, and if it is not replaced, there is an end of the monument! There is thus often an absolute incompatibility between practical necessity and the preservation of architectural and artistic effect.

The Basilica of St. Mark has three façades, — that on the south, towards the Piazzetta; that on the north, towards San Basso; and that on the west, towards the Piazza San Marco. The repair of the northern façade was first taken in hand. Men of the rising generation have never seen the original façade. The works were commenced in 1842. To understand the changes effected it is necessary to refer to old drawings and descriptions. The chief beauty of this façade consisted in the precious bas-reliefs which were encrusted in the walls. They were composed of sculptures brought from Altino, Aquileia, Grado, Torcello, Byzantium, and even from Persia. The surface was coated with Oriental marble. In the progress of the works the bas-reliefs were preserved, but the entire *revêtement* was renewed. The façade has assumed a tone that is grey, hard, and dry, from which the sculptures and the capitals of the columns, blackened by time, stand harshly apart. It was thought proper, for the sake of uniformity, to reduce the ancient columns, brought from many a ruined temple, to the diameter of the capitals with which they had been surmounted. Thus the chisel and the rasp destroyed the graceful entasis of the columns, and the brilliancy of which their rich material is susceptible. The bases of the columns throughout have been solidly fixed on new foundations. The mouldings are fresh, sharp, and exact. Symmetry and rigorous uniformity have replaced a less rigid, and often irregular treatment. The ground of verde antique which relieves the Moorish arch of the thirteenth century, with its curious bas-relief of the Nativity, has been untouched. It preserves its antique *patina*, and the result of the contrast thus produced is a violent discordance of effect. Without entering into too minute detail, it may be pointed out that the special physiognomy of the old *revêtement* is destroyed. All the veining of the marbles in the ancient casing, — as, indeed, true taste, if not due consideration for the absolute durability of the material, would demand, — was horizontal. In the new work the veins are perpendicular. Thus the modern façade is really quite different from the ancient elevation; and even if the substitution of marble be admitted to be wise, the monument has lost much more than the halo of antiquity which harmonized its different parts.

It was the removal of the southern façade, that which looks upon the *Piazzetta*, which, led as our readers know, to the protest of Count Zorzi, and the subsequent action of artists and art-lovers in England. There is no doubt that this façade was in a state of menaced ruin. Not only were the walls cracked, and the *points d'appui* out of plumb, but the foundations themselves had become unable to resist the pressure to which they were exposed, and the Chapel Zeno, the baptistery, and the treasury were in danger. The works of restoration were commenced in 1865. The architects of the church were then controlled only by the fabric committee of the Duomo, which contained but one competent member, M. Saccardo, a civil engineer. The Austrian Government was then supreme at Venice; but the direction of the restorations was confided by them to the recommendation of the Academy of the Fine Arts. When it was proposed to substitute modern compositions, by an Austrian artist, for the twelfth-century mosaics, M. Saccardo energetically opposed the scheme, and had the happiness of doing so successfully.

The work thus effected cannot be called restoration. It was a total reconstruction of the façade, including foundations, walls, and vaulting. Rightly judging that the nature of the soil was the cause of decay, the architect began by driving more than 20,000 piles, on which he laid a bed of Trieste stone. On this he rebuilt the façade, and, such as the work is, it may now remain for ages. It cannot be denied that the building is no longer the same, however faithful was the attempt to reproduce the St. Mark of the Crusaders. Sad necessity has destroyed the beautiful façade, of which the splendid materials had been gilded by time, and richly colored by the effects of centuries of the Venetian climate. All that can be claimed for the work is that it is an attempt, naturally not perfectly successful, to reproduce the original architectural conception.

With regard to the principal façade, the immediate object of public solicitude, its situation is not yet entirely compromised, excepting at the return of the angle of the façade. Here the architect

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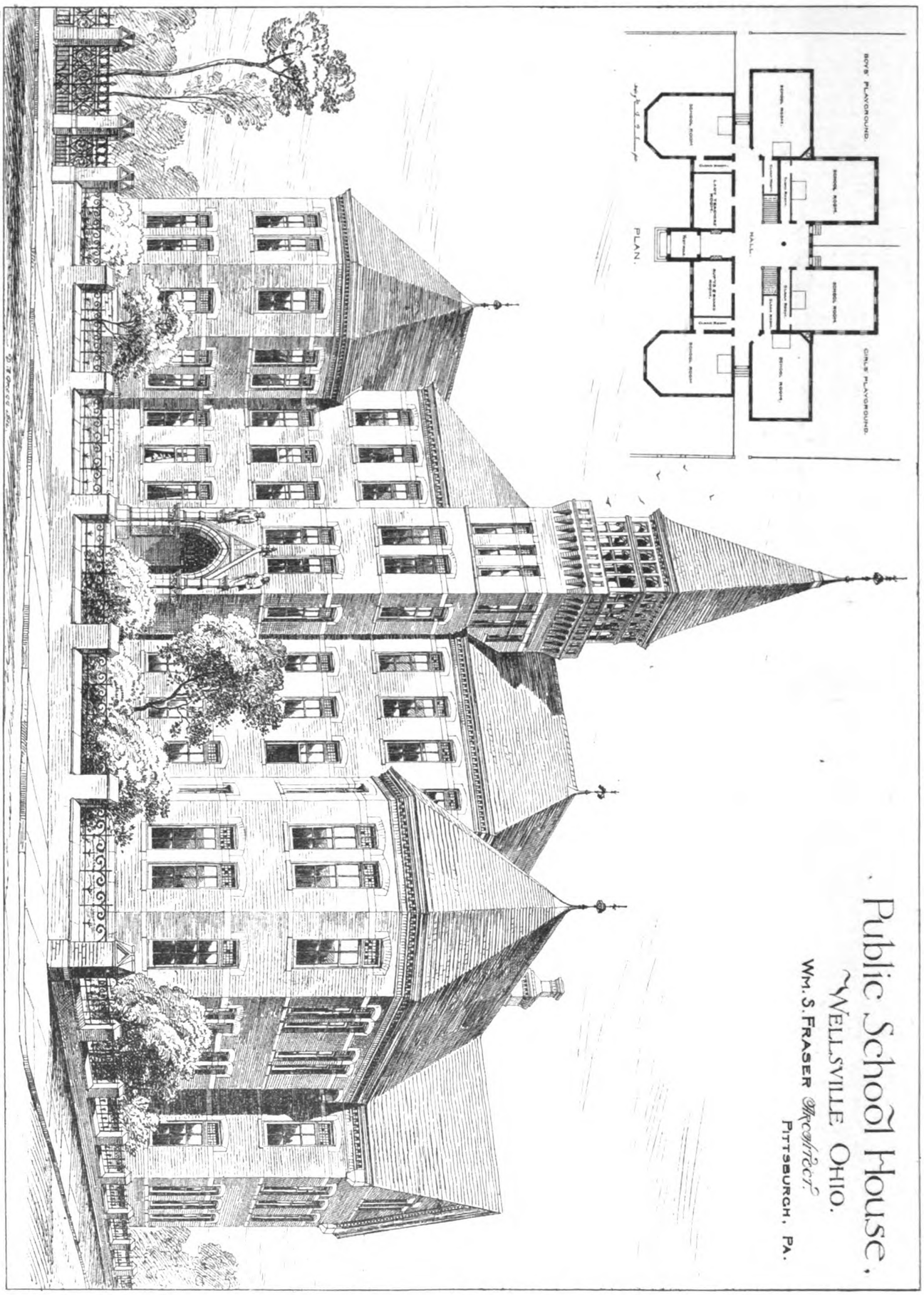

Public School House,

WELLSVILLE OHIO.

WM. S. FRASER *Architect*

PITTSBURGH, PA.

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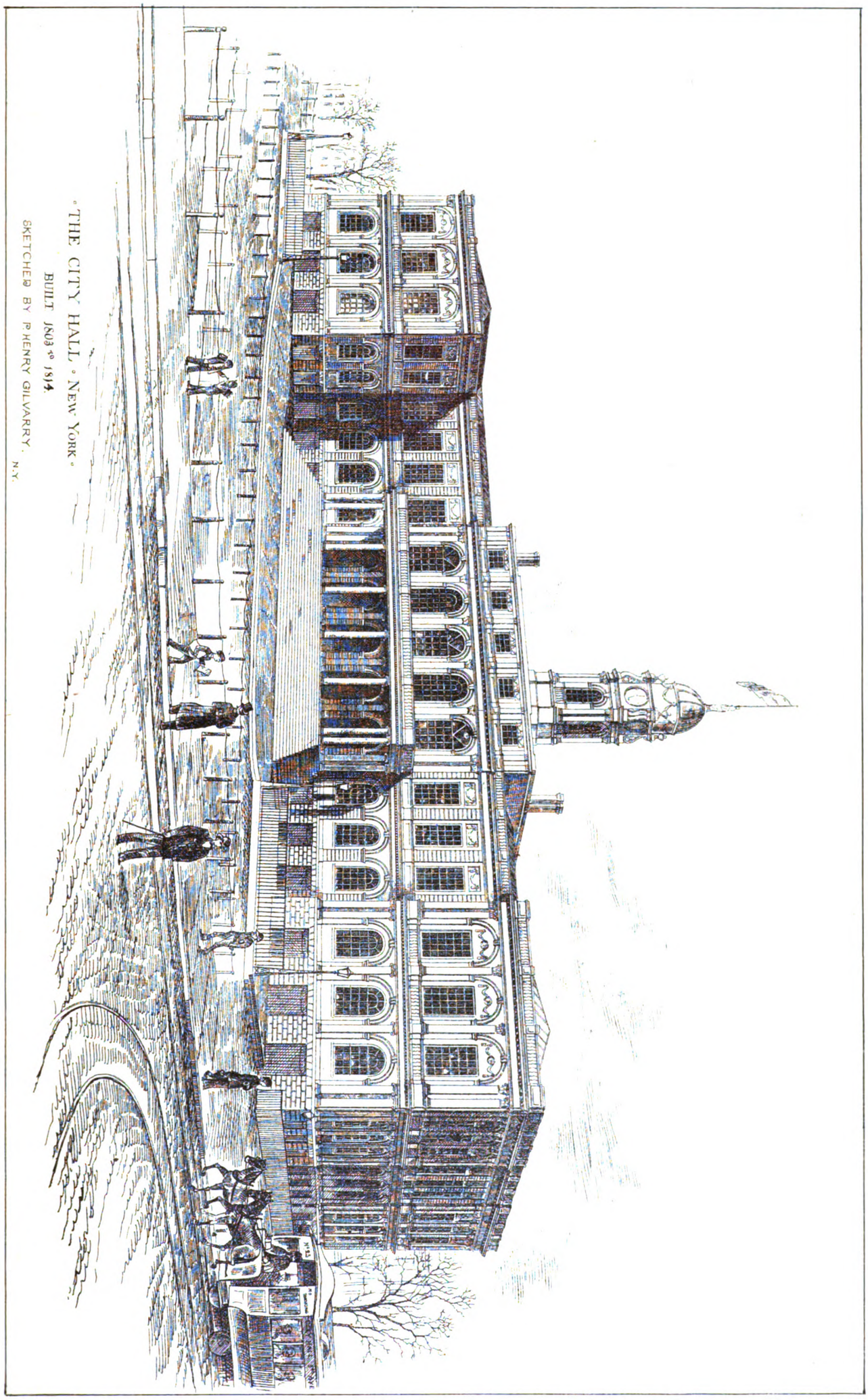

THE CITY HALL · NEW YORK ·

BUILT 1803 TO 1814.

SKETCHED BY P. HENRY GILVARRY. N.Y.

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having raised all the plane of the base by, at least six inches, a rise which affects the whole gallery round the building, had prepared for the scaffolding for the future restoration of the whole principal façade. The Italian Government, however, has now declared that if, on a careful survey of this part of the monument, it appears not to be in actual danger, no further work shall now be carried out. Meantime, the operations are entirely suspended. — *The Builder.*

THE ILLUSTRATIONS.

OFFICE OF THE PHŒNIX INSURANCE COMPANY, CINCINNATI, O. MR. SAMUEL HANNAFORD, ARCHITECT, CINCINNATI, O.

THE CITY HALL, NEW YORK, N. Y. MR. JOHN MCCOMB, JR., ARCHITECT.

THE corner-stone of the Hall of the City of New York was laid by order of the Common Council on the 26th of May, 1803, the twenty-seventh year of the Independence of the United States, by Edward Livingstone, mayor. The total cost of the building was $538,733.45. The building committee consisted of John Oathout, Wynant Van Zandt, Philip Brasher, Joshua Barker, Mangle Minthorn, Jacob Leroy, Robert Bogardus; John McComb, Jr., architect; Joseph Newton, carpenter; Anthony Steinback, Anthen Smith, masons; George Knox, Alexander Campbell, stonecutters. The eastern and southern fronts, seen on sketch, and also western, are of white marble. The north front is of brown-stone, it being considered extravagant at the time to use marble, as the city did not extend farther in that direction. The building was finished in 1814.

PUBLIC SCHOOL-HOUSE, WELLSVILLE, O. MR. W. S. FRASER, ARCHITECT, PITTSBURGH, PA.

The building is of brick, with local sandstone and white Milwaukee brick for the finish. The contract for the building, including steam-heating apparatus, but excluding the seating, was $26,000. The total cost including inside shutters, stained-glass in transoms, seating, and the necessary outlay outside the building, will be $32,000 or $33,000.

CORRESPONDENCE.

THE WATER-COLOR EXHIBITION.

PARIS.

THE recently-awakened interest in water-colors has, during the past year in Paris, produced results which must be noted as of permanent importance to art. The English have for so long given such attention to this branch of painting, that it is not strange to find persons counting this movement as another of the fashions in which the French have of late been imitating their insular neighbors. But this is an error; for the new influence came from Italy, and it will be perhaps hereafter the chief glory of the Roman water-color school to have given a valuable hint to French artists, who had heretofore used water-colors as merely a means of hasty sketching. At a time when English water-colorists were laboriously muddying their naturally transparent medium, so as to produce a weak imitation of oil painting, the simplicity and brilliancy of the pure water-color studies by that cosmopolitan genius, Fortuny, came like a revelation to the French public. The Simonis and Simonettis who followed in his footsteps showed that the simplicity of the process brought it within reach of all, and aquarellists suddenly appeared in force. Amid the wilderness of great canvases in the annual *Salon*, the public have neither the spirit nor leisure to examine delicate water-colors, and so a small club was formed under the title of "La Société des Aquarellistes," for the purpose of exhibiting the members' works to the best advantage. As this little coterie of artists belongs to fashionable life their prettily-furnished rooms were at once crowded by people of distinction, and their first exhibition, last spring, obtained a social prestige which insured success. From this, and the fact that two of the members are ladies, their gallery, in contrast to the *Salon*, might be called the *Boudoir*. Last autumn they filled the gallery with oil pictures; but this was not so successful. They will do better to preserve their distinctive character, as is shown by the renewed success of their present water-color exhibition, which is even more interesting than the first one.

Through the older to the younger members, the club illustrates the entire history and practice of water-coloring in France, since its introduction from England by Delacroix down to the present day, and curiously enough, the two methods of transparent and body color may be traced back, side by side, through their various modifications. Thus Eugene Lami and Isabey both belong to the last generation, sketching as vigorously as ever the brilliant costumes and splendid pageants which they themselves saw in the beginning of the century. One looks with awe at these old men, dashing off instinctively, and with graphic touch, the costumes and ceremonies which their brother painters have now laboriously to reconstruct in libraries and museums. They both use body-color more freely than of old; for generally painters, as they advance in years, become impatient of washes and glazes with their delicate but slow results, and love to dash in at once their effects with opaque colors. They both have rather a theatrical style. Lami loves to illustrate, with delicate *finesse*, scenes from Molière. Isabey has a fantastic imagination, and throws a certain scenic effect over all he does; there is a tragic mystery in his hurrying processions and stormy coast scenes. However conventional his color is, there is always great life and movement in his wind-tossed draperies and dramatic figures, dashed off with tremendous *fougue*. In bright contrast with the preceding compositions are Baron's melodramatic pictures, like pretty drop-curtain scenes. Sumptuous banquets on palace terraces, Fountains of Youth in the loveliest retreats, etc., give never-failing opportunities to this modern Veronese — but what a diminutive one! — to display his exquisite color and graceful figures amid their Venetian luxury. This sentimentalist, in spite of his skill in all the resources of both body and transparent color, becomes monotonous from cloying prettiness. If these men seem out of date, Français reaches far back past them to the school of Claude, and offers the measure of realism of modern French landscape. He has the grand manner, the harmonious composition and subdued tone of the early masters. Conscientiously studying from Nature, he still only paints it as seen through an ideal atmosphere and I must own that his elegant chastened views do not appeal to me, for they never have those accidents and surprises by which Nature converts one's admiration into sympathy. There is nothing intimate in his expression of a scene. You see the beauty of his atmosphere, but you never feel in it the dampness of sunset nor the hot glare of mid-day. I spoke of Français as closely studying Nature, but it is as a draughtsman; for, the laborious drawing of his studies concluded, his conscience and interest are satisfied, and the local color is washed in chiefly as a base from which to compose a scheme of coloring for the picture; hence the conventional tone of his work. With these characteristics, it is not surprising to notice among his water-colors a preference for the classic gardens of Italy and the grand lines of her Campagna. He uses generally washes upon old-fashioned coarse gray paper, touched up with body-color. Rather old-fashioned, too, in their way, are Beaumont's pretty water-colors, which have a certain English sentiment.

The other members of the Society, though each with a distinct personality, have in common a marked modern character. Beginning with those who most use body-color, Heilbuth comes first, for his work is entirely opaque, treated in broad masses without stippling, just as he does oils. This process, to be sure, has over oils the advantage of saving the painter from the labor at night of washing out his brushes, but is inferior in every other respect; yet Heilbuth throws such graceful sentiment into his figures that they are charming, whatever *technique* he chooses to employ. Détaille, the military painter, also uses water-colors as he does oils, and with a certain success when on a small scale; but in the two large compositions we have before us, the technical result is a failure, and we can but wish they had been done in oils, to escape the dry look of distemper painting, for as studies they are of great interest — intelligent photographs, so to speak. Détaille went to England for a short time, to paint, by order, a scene in the Zulu war, and brought back with him, among other sketches, this Review in the Tower of London Court, and the Scotch Guard in Hyde Park, in both of which the expressions and attitudes are so perfectly characteristic that one can hardly believe they were not the result of long study and experience among the cockneys. Vibert, one of the most consummate masters in the manipulation of oils in Paris, is no less skilful, within the measure of possibility, in combining body and water color. His work is most carefully stippled, and he obtains, by laborious artifice, almost the *natural* effect of oils, as far as solidity goes, and, I must add again, in small single figures; for in his Interior of a [pseudo] Japanese Bath, a large picture, all his patient labor and skill have not saved him from a signal failure, owing partly to the disagreeable, labored color and partly to the difficult point of sight chosen. I regret to be forced now to class among the body-colorists an artist who, a few years ago, used pure water-color with such charm that he may be said to have been one of the chief influences which brought *aquarelles* into fashion. Louis Leloir's small figures are as exquisitely drawn and colored as formerly, and the body color is so cleverly applied that it can hardly be seen; yet it is felt in the absence of that clear sparkle and crisp brilliancy which has been sacrificed to obtain solidity by a fine stippling like miniature painting. His art, however, is exquisite, and his collection of works at the Universal Exhibition I believe to be (if I except the more free and sketchy works of Fortuny) the most successful result ever obtained in the application of water-color to finished studies of figures. This Leloir must not be confused with Maurice Leloir, whose careful work is much inferior in brilliancy and snap, although the latter has a sense of humor which gives interest to the episodes he represents. But more clever, and probably the wittiest painter in Paris, Worms, is painter *par excellence* of amusing episodes, which are so generally taken from Spanish life that he is often set down as a Spaniard. Worms uses transparent washes with skill and success in his sketches, and it is only in closely finished work that he uses opaque color, and then it is carefully and delicately introduced. Each of these last-named men introduce their body-color only in the high lights or to bring planes forward, and it is done very discreetly, almost apologetically, concealing it as much as possible by grading it into the washes. Stippling is very apt to lead to this retouching, though there are Italians, who, like G. Simoni, model most minutely the flesh by stippling, and yet hold in horror Chinese white and its compounds. To be sure, less skill is required and time is saved in dotting that speck of white upon the nose, instead of carefully working around it, but in the end the result is worth the pains, if not in an individual instance, at least in avoiding a habit which generally becomes fatal.

Before speaking of those few water-colorists who have the courage to keep to the most beautiful, though the harder process, I must men-

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tion Lambert, the painter of cats, — of cats, and nothing but cats, and yet in his feline families he expresses a great variety of sentiments of an amusing and charming character. His baskets of kittens are inimitable, and he has immortalized the beautiful long-haired race of Angora cats. His most charming contribution is a fan with a circle of twelve heads of kittens, each with a different characteristic expression, rendered with a few strokes of the brush. Most of the members of the Society exhibit a design framed as a fan, but one wonders at such affectation, as fan-painting can only have interest from the composition being adapted to the form of a fan, and Lambert and Beaumont are the only ones who have attempted to do this. An architect might insist that the character of a fan should in some measure decide the subject to be placed upon it, but such ideas of decoration seem quite unintelligible to the average painter, who generally paints without hesitation his specialty. Thus, I have seen — not in this exhibition — on a fan a woman hoeing potatoes — very well painted, too; on another, by a well-known military painter, soldiers making soup: that half of them had their dirty feet and legs cut off by the circle of the fan, was a pardonable defect in the design.

I now come, and with undisguised pleasure, to the pure water-colorists, among whom I class Gustave Doré. Although he occasionally uses a little body-color on a figure, he shows an entire appreciation of transparent effects, and uses them with consummate skill. His best contributions here are some Swiss scenes, done with a few strong washes. Very refreshing are Jourdain's landscapes, rendered as much as possible with a single tint, by running colors in together when wet, which always gives a delicious freshness to them. Jacquet contributes some charming figure studies for his large oil picture, The Minuet. They are indicated with great *chic* by a single tint, cleverly varied. Madame Madelaine Lemaire was one of the first to practise in Paris the Roman water-color style, and has attained remarkable skill in the use of transparent color. An architect cannot fail to be delighted by the ease and simplicity with which she indicates the furniture, tapestries, and other accessories in her figure studies. She uses, like the Romans, a great deal of water, and, though not running colors together much, she manages to overlay her washes and keep all their delicate transparency. This year she contributes, beside several flower pieces, two exquisite female figures, the best she has ever done. Everything, except the stippling of the flesh, is in the freshest tints. Her flowers are too cold and hard, though done with the same brilliant execution. Jacquemart exhibited, last year, some views boldly washed in, appearing as if done by a clever painter not yet quite at ease with water-colors. If that was really the case, the painter now has gained not only a thorough mastery of his washes, but proves himself to have the most daring originality in attacking difficult effects and rendering them, in all their details, with an ease and simplicity which I have never before seen approached; be it the glare of a sunny road at Mentone, or a rainy day on the quays at Marseilles, each is simply and forcibly expressed with a few washes — rarely overlaid — and over this he boldly sweeps a dry brush, to give necessary indication of detail; he even passes the side of this dry brush over distant hills, and, wonderful to say, they still keep their place. Dry brush work in the foreground is invaluable, but I have never seen it thus successfully used in the distance, without washing or sponging over it. It is in vain to seek how Jacquemart succeeds in giving to each scene so much character with such simple means, for there is no concealment; a single wash, with colors run in so rapidly that the absorbing paper often leaves little specks of white, is made to express at once as much as possible and then, as I have said, a few touches of a dry brush complete an absolutely truthful sketch, of a deliciously fresh tonality. His process has a charm from the extreme freshness of the color, but his success lies in the unerring precision with which he lays his wash. His works have excited much enthusiasm, and will help to show the true process and aim of water-colors. If I have little to say of the Baroness C. de Rothschild's studies amid such excellent professional work, it is because her name and wealth having opened the doors of this select club to her, that honor is sufficient, and I may add, her sex is so evident in her handiwork that it would be ungallant to say more. Water-coloring now may be said to have taken a vigorous start in Paris, and, to judge by the large prices paid for works in these exhibitions, will tempt many clever artists in the same direction. I sincerely hope some of the best examples may find their way to America.

R.

VENTILATION AND CLEANING OF SEWERS.[1] — II.

No city in the world has spent so much as London upon this subject. The reports of the Metropolitan Board of Works give a complete history of their experience, from which the following abstract is gathered. The original method of ventilating their sewers was by the "gully gratings" or inlets at the sides of the street. These were efficient so far as ventilation of any kind could help the wretched condition of these old, half-choked receptacles of filth. But, as may readily be imagined, they became sources of great annoyance to foot-passengers, as well as to the adjacent residents so that while the sewers themselves have recently been made "self-cleansing," these openings near the sidewalks have been trapped as fast as others were made in the centre of the street, by building shafts for that purpose, with perforated covers. During the period of transition, however, from the former filthy condition of their sewers to their present comparatively clean condition, through judicious reconstruction, various complaints arose from certain localities, on account of the bad odors arising from these new vent-holes. This subject has given rise to a prolonged investigation by experts, who experimented during a period of several years upon various devices for alleviating or entirely removing this source of complaint. But the system of frequent vents in the centre of the streets has never yet been abandoned, simply because no other device has yet been found adequate to take its place. We learn from the report of 1865 that the subject of the ventilation of the sewers was referred to a committee who were then experimenting upon the ventilation of the Southern Outfall Sewer by artificial draught, created by furnaces in Woolwich Dockyard. This committee employed Sir J. Bazalgette and other experts, and finally made a report in 1872, giving a review of all the various methods that had hitherto been adopted in the metropolis. They stated that the amount of success attending these various methods "was variable, depending on the local circumstances of each particular case." In short, no one method was found to be generally applicable, and most of the expedients tried were found to have an effect that was only palliative, even for the locality where it seemed best adapted to the circumstances there existing.

Among the experiments tried, a large class were with the view of deodorizing and disinfecting the gases which escaped from the street vents. The device which attained the largest measure of success in this direction was that of suspending charcoal, spread upon gratings, one above the other, in the vertical shafts above the sewer, through which the air must pass while moving upward on its way to the open air in the street. So long as this charcoal remained dry and loose, it worked well, and afforded considerable relief in certain localities. Its use was adopted by Liverpool and various other towns, in a similar manner and with similar results. Various patented devices were applied for holding and exposing this charcoal in a manner which should least obstruct the passage of the air, while keeping it free from dirt and water falling from the street, and giving the largest facility for renewal when it became clogged. Such renewals were frequently found necessary in most places, in order to keep the apparatus in an efficient condition. This involved considerable cost and trouble for attendance, besides the outlay for the apparatus itself. Moreover, the Board states, in summing up the whole subject, that although the results were sufficiently favorable to warrant the use of charcoal in some of the air-shafts which were sources of annoyance and complaint, it was found that their use was attended with no little inconvenience; for the charcoal obstructed the exit of air through the shafts, thereby causing such an accumulation of bad gases in the sewer as to endanger the safety of the men whom they sent to work in them. "It therefore became necessary that such vents should be cautiously and not generally applied."

Experiments were also made by disinfecting or deodorizing the air from the vents by use of acids and of chlorine gas generated in the shafts, by apparatus placed there for the purpose. Although a partial relief was had in some cases, the variable nature of the foul gases to be dealt with prevented this method from being adopted, except in certain limited cases where peculiar circumstances existed; so that such a method could be but very partial in its application, and could never become general.

The plan of ventilating the sewers by air-flues connected with the furnaces and shafts of factories and other buildings was tried in some localities south of the Thames, and the effect was considered beneficial by the residents of the immediate neighborhood. But the good effects were confined to a small district in each case, and it was doubted whether any large portion of the noxious gases evolved was actually consumed by this method, for this reason, viz.: The vacuum produced by the artificial draught was inevitably supplied by the air entering the sewer through an immense number of openings in the close vicinity of the locality where the exhaust draught was applied, so that the air drawn out from any part of a long sewer near which a furnace was applied was to a large extent replaced, not, as was desired, by the offensive gases from distant parts of the sewer, but by pure air rushing down through the numerous small openings near the furnace, leaving the more remote places uninfluenced. For this reason, also, the method used in mines, where there are only two openings to be dealt with, is inapplicable to sewers. Moreover, where the chimneys used were not public property, the owners of the factories or furnaces objected to such connections being made with their chimney shafts, while in many parts of the city no such factories existed. In order to provide chimneys and furnaces specially for such localities, and maintain them in blast, a very large cost would be incurred for a remedy that would at best be confined in its action to a very small district in each case, for reasons given above.

The plan of ventilating sewers by pipes carried up the outsides of houses, which we have hitherto discussed and objected to, was also tried in London to some extent, but was condemned because of the reasonable objections of the owners of the buildings, and "in consequence of the liability of the gas to descend into the chimneys and windows of such houses." The Board tried an experiment at the east end of Southwark Street, by erecting an ornamental ventilating shaft in the centre of the thoroughfare with refuges and lamps, and the extension of this system to other localities was discussed. Its adoption was estimated to cost from £200 to £300 in each case, according to

[1] A lecture by Mr. Edward S. Philbrick, C. E., delivered before the students of the Massachusetts Institute of Technology.
This lecture, although delivered in this course, was published essentially in its present form in the *Sanitary Engineer* some two years ago.

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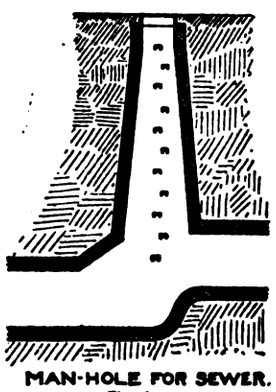
the position and depth of the sewer, exclusive of the cost of maintenance. If this system were to be largely extended, it was found that the details must be varied to suit the local peculiarities which must be considered and provided for in each case, which would involve a separate study for each locality, and prevent the possible diminution of cost by a repetition of the forms of the appliances to be used. In short, it was found that every new case must be tentative in its nature, and therefore not susceptible of having any accurate estimate made of its cost. The only principle settled upon as capable of a wide and successful application was that of flushing the sewers with such a copious supply of water, that the decomposing substances clinging to their sides or flowing through them should be largely diluted and carried away before sufficient time should be given for the generation of noxious gases in any considerable volume. To accomplish this result frequent flushing would be needed during periods of drought; but during periods of rainy weather the natural influx of water might sometimes take the place of flushing, especially in a climate like ours, where rain in the summer months frequently falls in large volume during a few hours. The Committee of the Metropolitan Board were requested to continue their investigations, treating each case as the local circumstances might indicate. Four years more were spent in experimenting, but with no result except that the various devices tried were found to give various degrees of success in various localities, as before. In 1876, the committee reported a sort of digest of their conclusions, giving them in a concise form.

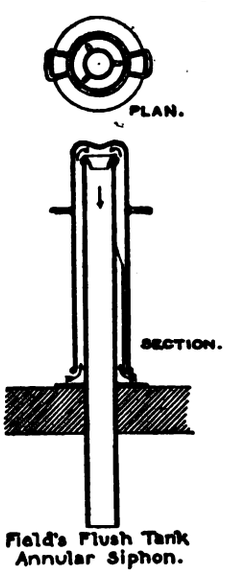
CLEANSING OF SEWERS.

The inclination of sewers is generally governed more or less by the topography of the surface; but in flat districts, where the fall is limited by Nature, a sewer must, in order to be self-cleansing, have an inclination that will secure a velocity of at least three feet per second in small pipes, and of two and one-half feet in larger sizes. Where this cannot be obtained without pumping, pumps are often applied, which by lifting the sewage to a sufficient height enable us to conduct it farther from the city, and to a point of discharge which is more eligible than could be found nearer. If the large sewers are not self-cleansing, arrangements must be made for ample flushing at frequent intervals, and perhaps also the removal of sand by hand, which must be taken out through the man-holes. The heaviar part of the road detritus is generally intercepted by pockets or catch-basins at the inlets under the curb-stones; but in heavy rains the water does not remain long enough in these pockets to deposit the finer silt which is therefore very likely to be deposited within the sewers themselves. The modern forms for sewers with small narrow invert are much less likely to collect deposits than the older forms or circular sewers; yet the latter are sometimes adopted, as in Chicago, for lack of height below the street level. This is admissible for such sewers as are generally half filled, or more, with their ordinary flow, and in that way more likely to be kept clean by scour. In order to favor the velocity of flow, and guard against checking it by all possible means, great care should be taken that all inlets and junctions should be at an oblique angle. Rectangular junctions are always found to produce eddies and favor deposit, whether the inlet is applied on the side or top of the sewer. The ordinary house inlets are provided for by Y branches in pipe sewers, and by special branch blocks in brick sewers. Where sewers join at street-corners, those on either side the main should be curved around to approach parallelism before joining, and come together in a bell-mouth. The invert should be prolonged in a tongue beyond the point where the sides join, so as to guide the current as far as possible to a parallel course. Inverts of stone-ware are now made, and are superior to brick for two reasons. They not only resist the abrasion of sand for a much longer time, but being made hollow, afford a channel for the ground-water, which is often a great convenience in favoring construction in wet ground. This means of draining the soil-water, if adopted for permanent use, does not keep it so well separated from the sewage as may be desirable, for the sewage would almost inevitably leak into such ducts. Junctions are often made at man-holes, and many reasons favor their being so made, for convenience of inspection and cleaning out. In order to avoid the checking of currents which are inevitable when such junctions occur at a considerable angle in man-holes, Latham and other writers advise stepping down some six inches or more at the man-holes to accelerate the flow. (See Fig. 3.) Wherever there is sufficient fall to allow this and at the same time retain slope enough to keep up the proper velocity in the sewer, there may be no objection to such a course; but where there is no fall to spare, as may often be the case in flat districts, the loss of head by the ordinary man-hole junction ought to be avoided. This loss of head is partly due to the sudden change of direction of the current by bringing in the branch sewers at right angles with the main, and this can be avoided by a previous curvature of these branches near the man-hole. But a good deal of the trouble arises from the contraction of the vein of the current in entering the sewer as the water passes out of the man-hole. This can be remedied in a large degree by rounding off the corners, like a small bell-mouth, to conform with the vein of contraction. The method of stepping is advocated as an assistance to ventilation, it being alleged that the air in passing into the man-hole is by this step, deflected upward, and finds a readier exit through the top of the man-hole into the street. But in practice I cannot attach much value to this consideration. This argument, whatever it may amount to, must depend on the supposed *momentum* of the air, which would tend to prevent it from rising and throw it across the man-hole if built without a step; but the velocity of the air, when at its greatest, can never be so great in a sewer provided with a proper number of man-holes, as to allow of any momentum being acquired by the air which would produce any practical result. Moreover, if the air is to be poured *out* at every man-hole, where is it supposed to come from? If from the lower end of the system, near the outfall, the quantity of air so entering any sewer could, if all diverted upward, readily find exit at the first ten man-holes that it encountered, leaving no current to go beyond. The fact is, I imagine, that air is drawn *in* at all the man-holes of a district whenever a heavy rain-fall is running off, as the water subsides, and again every evening, as the amount of sewage flow due to the working hours subsides to the night flow; and flows *outward* at all of them when the fluid contents are increasing from similar causes. Whatever currents through the sewers are due to winds outside, are influenced by the air entering at any point on the windward side of the town where the wind-pressure accumulates by being confined between walls or otherwise, and goes out again on the leeward side of the town where it finds the least resistance.



MAN-HOLE FOR SEWER.
Fig. 3.

The flushing of sewers by intermittent flows or artificial methods is often found necessary to keep them clean in a district having a limited fall. Various methods are pursued for this purpose, suited to the local circumstances. Where streams of water are found at hand, they afford the best means of flushing, and provision can be made for using them by laying conduits and building tanks for that purpose. But where no such streams exist, the sewage itself is often dammed back by a gate till a considerable length of sewer is filled or nearly filled, when, the gate being suddenly opened, the restrained water rushes along, and scours the sewer for a considerable distance. These gates are sometimes made to be operated by hand, requiring the presence of an attendant, and sometimes made to work automatically, by the height of the water. In conducting all flushing operations, care must be taken to guard against the flooding of houses by impounding sewage to too great an extent, and at the same time to use a current of sufficient volume and force to wash all the inside of the sewer. There is in all sewers a film of organic matter in a slimy condition, clinging to their sides, consisting chiefly of putrid greasy refuse, emitting a very foul smell, and therefore not a desirable material to retain. Rain-water may assist in flushing sewers very materially; but as it is extremely intermittent in its action, some more reliable source is often needed, by which the process can be repeated at will and at certain intervals, found by experience to be required in any particular locality. It is usual to begin flushing at the lower end of a district and work back. Each successive discharge will generally be carried quite through the system in this case, unless large deposits have been allowed to accumulate through too long neglect, which may stop on the way and need following down the line by more water. Tanks are sometimes provided at the upper end of small pipe-sewers, to discharge automatically when filled. If these are made to hold the sewage, a sufficient height is rarely obtained in flat districts to enable the tank to be filled without setting back the sewage to an inconvenient extent into the house-drains. It is better to use rain-water, brook-water, or water from the mains that supply the town, in such cases. It not only washes the sewer better than sewage, but avoids all chance of setting back the sewage in house-drains, for the tanks can in that case be made entirely independent of the sewer except while they discharge, which is done through a pipe at the base of the tank or a siphon at a similar level. The automatic siphon of Rogers Field of London is often used in England for this purpose, especially for flushing house-drains. The best form of siphon for sewers is the annular one (see Fig. 4), composed of two concentric tubes, one inside the other: the inner tube forms the long or outlet end of the siphon, the outer tube being sealed at the top. The air is readily expelled from the siphon by a very small stream of water, if this can be made to fall *through the air* in the inner tube instead of trickling down its sides, for which purpose a funnel-shaped mouth is provided at its top. The inner tube must dip in water at its lower end, or outlet, before the air can be expelled; for which purpose a basin is constructed for it to slip in. If kept thus sealed all the



Field's Flush Tank
Annular Siphon.
Fig. 4.

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time, however, the siphon would keep delivering the water as fast as it comes into the tank, which would defeat the object. It is important, therefore, to allow the air to enter the siphon after discharging the tank. This is accomplished by applying a small siphon to empty the little basin in which the lower end of the large siphon dips. This small siphon is readily charged by the rush of water while the large one is in action, and as soon as the tank is emptied the small siphon draws the water off from the discharging end of the large one, and both are empty. As soon as the tank fills up, the first quart of water that overflows through the large siphon seals its lower mouth, and as this overflow continues, it is made to drop clear of the sides of the tube by the funnel-shaped appendage at its top, which turns the the water into the centre of the tube. The small siphon is best when made of lead, which is a metal that suffers but very little change in such situations.

NOTE S AND CLIPPINGS.

A Loadstone Mountain. — There has just been discovered in the northern part of Sweden a mountain in which lies a vein of magnetic iron ore of unknown length, and more than a metre in depth.

Insanitary Condition of a London Club-House. — A startling discovery has been made at the Junior United Service Club, London, which will necessitate the closing of the club for some months. It has been discovered that the air pumped into the building came direct from the main drain, and the drainage from the kitchen is also in direct communication with the sewer. In fact, to use the words of the report of Mr. Field, C. E., the air of the sewer is, as it were, laid on to the house.

St. Gothard Tunnel. — The length of the tunnel is 14,920 metres (9.27 miles), the breadth 6.5 metres (7.11 yards). The perforation has required seven years and five months (4½ years less than Mont Cenis). The average progress per day has been 5·5 metres (5.541 yards). The blasting has used 490,000 kilogrammes (1,302,821 pounds) of dynamite. The total number of mining holes was about 320,000. There have been 1,650,000 drills, and 1,450,000 cart-loads of material have been taken from the interior of the mountain. — *Les Mondes.*

The Tuileries. — The commission which is charged with deciding what shall be done with the Tuileries has just decided unanimously, after listening to the opinions of M. Lefuel, the architect in charge of the Louvre, and M. Daniel Ramée, to restore the palace, this course being considered less expensive than a complete reconstruction. This step will be taken with the express understanding that the palace shall be used as a museum. M. Lefuel has been directed to prepare preliminary plans and estimates.

Pergamon. — In view of the curious interest generally felt as to the excavations at Pergamon, it has been decided to prepare immediately a concise official publication of their chief results. This will contain the better preserved blocks of the sculptured friezes, from drawings by Professor Knille, plans and elevations of the altar itself, and perhaps also of the Sebasteion and the Roman gymnasion. It may be hoped that the photographic views of the city walls of Pergamon, among the chief scientific results of the expedition, will be included in the volume.

Cologne Cathedral. — While one party of workmen is busily completing the summit of the south tower of Cologne Cathedral, another party is equally active in renewing the foundation of the same tower. This race between progress and decay is going on in other parts of the building, so that it sometimes looks as if the building, even if it does not fall into complete decay, would never be delivered from the sound of the mason's chisel and stone-plane. However, the stone roof of the north tower is now in place and rises above the surrounding scaffolding.

Effect of Use upon the Quality of Iron. — In the summer of 1878, Prof. Bauschinger superintended some repairs upon a chain bridge which had been built in 1829. He examined several of the links by various tests, and found that there was no evidence of any diminution in the strength of the iron, nor of any change in its structure or its elasticity during the use of nearly half a century to which it had been subjected. In 1852 Von Pauli tested several bars for another bridge, which was repaired in 1878, when Bauschinger subjected some of the same bars to new tests. He found that the mean strength was still the same, after twenty-five years' use, and that no change of structure appeared to have occurred since the time of Von Pauli's original tests. — *Dingler's Journal.*

An Ancient Jutland Tomb. — Our correspondent at Copenhagen writes: "An interesting and probably unique discovery has been made close to the town of Randers, in Jutland, of a grave, dating probably from the sixth or seventh century, containing the remains of a woman who had been buried in her richest attire, it being still possible to trace the dress, which had been interwoven with gold thread. Across the chest were laid two bands with a kind of gold lace, on the top of which again were laid some ornaments composed of colored glass beads, some having an outer shell of gold leaf, and several cut like diamonds, as well as a small perforated silver coin. To the left of the body was found a knife, a pair of scissors, a small whetstone, (for needles) and a small glass cup, which was broken in pieces. In the tomb was found also the remains of a wooden pail with iron bands, which had contained the food supposed necessary to support the deceased on her journey to Hades. The discovery affords another proof of the exceptionally high position occupied by the women in Scandinavia during heathen times, in comparison with nearly all other heathen countries. The body had evidently originally been inclosed in a coffin of rough oaken planks. Great interest is taken in the scientific examination of the silver coin, by which the actual period may be at least approximately ascertained."—*The Pall Mall Gazette.*

Japanese Estimate of Japanese Art. — When the feudal system in Japan collapsed, in 1868, thousands of families became suddenly impoverished. They were then obliged to dispose of their heirlooms and art treasures for bread, or, when not so hard pressed, being driven from their official residences, they could not carry back to their future homes, in the remote provinces, their bulky *impedimenta*. Immense quantities of lacquer, bronze, and ceramic wares were then thrown upon the market. So low did the value of such objects fall, that foreigners would not even pay the price for them that the gold with which they were decorated was worth. The native dealers were, consequently, driven to the last resource; the beautiful gold work was rubbed off with charcoal, and sold to the makers of the cheap meretricious ware of modern times to be used anew. The objects most prized in Old Japan were not the articles so commonly seen amongst us here, so profusely displayed in the windows of tea-dealers and mercers — not even the lacquer ware we so prize as old, and have to pay such high prices for. It was, first of all, old swords, sword mountings, tobacco-pipe and pouch mountings, pocket-book mountings, beads, the buttons called "Nedzakies" — those quaint and curious bits of carving, many of which are gems; fans, with autographs and seals, sketches by personages of note, ancient and modern, old scrolls, albums of beautiful sketches, Chinese or Japanese poetry, written in any one of the many curious styles, fantastical, large and small, from characters each several inches square, to entire poems within the area of a superficial inch. Such were some of the art objects that were the delight of the cultured people of feudal times in Old Japan.

A New Horological Wonder. — A wonderful clock, said to be superior in mechanism and the variety of its performances to the famed Strasburg astronomical and apostolic clock, has been constructed at Detroit by Prof. Felix Meiers, a gentleman who has devoted his entire life to the study of astronomy and mechanics. It is called the American National Astronomical Clock, and it is among the most complex and ingenious horological works that the hand of man has ever produced. The clock is eighteen feet high, eight feet wide, and five feet deep, and weighs 4,000 pounds. It is wound once in twelve days, and is run by weights of 700 pounds. It shows the local time in hours, minutes, and seconds, and the time of thirteen other cities of the world, among which are Washington, San Francisco, Melbourne, Pekin, Cairo, Constantinople, St. Petersburg, London, Berlin, and Paris. It also denotes the movements of the planets, and measures their movements by seasons, years, and cycles for 200 years, including leap years. Concealed in its interior is a music-box, which plays when Death strikes each hour. At the same moment the figure of Washington seated in a chair beneath a canopy, rises to his feet, holding the Declaration of Independence in his right hand. A liveried servant sitting at the right hand also rises and opens a door, through which come all the Presidents of the United States, who march in review before the effigy of Washington, saluting him as they pass. The procession disappears through a door on the opposite side of the platform, which is opened and closed by a servant in gorgeous livery. The likenesses of these figures, including that of President Hayes, who is in the rear, are said to be excellent. As soon as the door is closed, the figure of Washington resumes its chair of state, and all is quiet until the hammer of Death again sounds the hour on the gong, when the extraordinary scene is repeated. The quarter-hours are struck by an infant, the half-hours by a youth, and the three-quarters by a man. It is reported that the Old South Society of Boston, has offerered $45,000 for the clock, the price of which is $50,000,

A Memorial of the "Princess Alice" Disaster. — The monument provided by a national sixpenny subscription, in memory of the victims of the wreck of the Princess Alice in September, 1878, has just been erected in Woolwich Cemetery, England, on the summit of the hillock where the bodies of the unclaimed dead were buried. The memorial consists of a cross of white marble, about sixteen feet high. On the pedestal is inscribed: "The saloon steamer Princess Alice, returning from a pleasure excursion, was wrecked off Tripcock Point by collision with the steam collier Bywell Castle, on the night of September 3, 1878. It was computed that seven hundred men, women and children were on board; of these about five hundred and fifty were drowned, and one hundred and twenty were buried near this place. To the memory of those who perished, this cross was erected by a national sixpenny subscription, to which more than 23,000 persons contributed. In the midst of life we are in death. Jesu, mercy." At all the graves have been placed small headstones, bearing the names of such of the dead as were identified, and the space which they and the monument occupy is carefully preserved and attended to.

Effects of Heat on Granites. — Mr. Hiram A. Cutting, State Geologist, of Vermont, has been testing the capacity of different sorts of granite to withstand heat. He tested twenty-two specimens of the best known quarries, and found that while all were unaffected by 500 degrees Fah., damage usually began at 600 degrees, was serious and frequent at 800 degrees, and at 1,000 degrees all the specimens were ruined, the stone from Mount Desert standing the test perhaps better than any other. He gives it as his opinion that the effect of water on heated granite is rather apparent than real. — *Scientific American.*

Fire and Water-proof Paper. — Mix one-third of ground asbestos fibre with two-thirds of paper paste in a solution of common salt and alum. Pass the mixture into a machine, plunge the paper thus made into a bath of dissolved gum lac and send it through the finishing rolls, when it may be cut into sheets. The salt and alum increase the strength of the paper and its resistance to the action of fire. The lac renders it impermeable to moisture, without interfering with its fitness for the reception of ink.—*Les Mondes.*

Viollet-le-Duc's Library. — The library of Viollet-le-Duc has been scattered by an auction sale which took place in Paris last month. The catalogue descriptive of the 2,242 lots formed an octavo volume of 290 pages.

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BUILDING INTELLIGENCE.

[Reported for The American Architect and Building News].

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

227,130. SEWER-TRAP. — William L. Randolph, Brooklyn, N. Y. This trap consists of three chambers, of which A is a prolongation of the inlet-pipe, and C is the beginning of the outlet-pipe. At the orifice of the pipe, C, is a valve-seat which receives the ball-valve, D. This valve-seat is placed at a higher level than the valve-seat formed at the top of the middle chamber, B, which is also closed by a ball-valve, E. The object of this difference of level is that as the water is forced by the momentum of its flow through the trap, the valve, E, which will be raised first from its seat, may in its rise lift up the valve, D, so as to uncover the orifice of the outlet-pipe, C, and allow the passage of the water. As soon as the flow ceases both valves drop back into their seats. This arrangement of valves also prevents the passage of sewer-gas from the drains into the house, for, supposing that the pressure of gas is strong enough to force the valve, D, from its seat, it can only affect E so as to press it more firmly onto its seat. The same arrangement prevents the siphoning of the trap by the entrance of water from other fixtures emptying into the same waste-pipe below the trap. F is a glass plate fixed in the side of the trap, so that the working of the valves can be seen. There is also a clear-out hole at the bottom of the trap.

Fig 1.

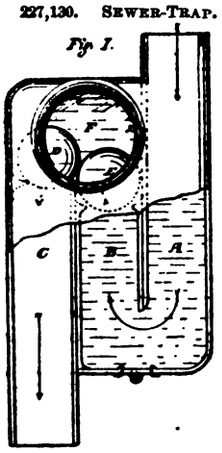
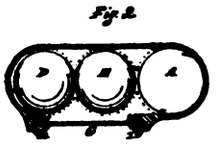


Fig 2.



228,166. STOVE. — Amos C. Barstow, Providence, R. I.

228,171. PROTECTOR FOR THREADED ENDS OF PIPES. — Henry E. Boyd, McKeesport, Pa.

228,188. HEATING AND VENTILATING APPARATUS. — James W. Geddes, Baltimore, Md.

228,189. WINDOW CORNICE. — Harvey F. Gray, Columbus, O.

228,194. COMPOUND PAPER FLOOR-COVERING. — Henry Hayward, New York, N. Y.

228,199. FASTENER FOR MEETING-RAILS. — Samuel P. Jackson, Manchester, N. H.

228,203. PUMP. — W. S. Laney, Lithopolis, O.

228,218. CIRCULAR SAWING MACHINE. — Paul Prybil, New York, N. Y.

228,219. FAUCET ATTACHMENT. — Charles A. Raggio, Chicago, Ill.

228,237. DRAG SAWING MACHINE. — Asa Wilkins, Cincinnati, O.

228,244. EXTENSION CHANDELIER. — George Bohner, Chicago, Ill.

228,245. VISE AND CLAMP. — James Brady, Brooklyn, N. Y.

228,249. CENTERING MACHINE. — John E. Dimsey, Vienna Station, Va.

228,264. FLUSHING CISTERN FOR WATER CLOSETS. — S. G. McFarland, Newton, Mass.

228,267. PNEUMATIC ANNUNCIATOR. — David and Theodore Morris, San Francisco, Cal.

228,274. MEETING-RAIL FASTENER. — Joshua Pusey, Philadelphia, Pa.

228,284. ELEVATOR GOVERNOR. — Isaac H. Small, San Francisco, Cal.

228,285. LIFTING JACK. — John State, Springfield, O.

228,288. SCREW BOLT. — Leopold Strauss, Middletown, Conn.

228,304. SPRING HINGE. — Lorenz Bommer, Brooklyn, N. Y.

228,323. LATCH. — George L. Crandal, Binghamton, N. Y.

228,331. BRICK AND POTTERY KILN. — Hermann Escherich, Schwandorf, Bavaria, Germany.

228,333. PIPE-TONGS. — Samuel Fawcett, Rochester, N. Y.

228,336. HOT-AIR FURNACE. — Benjamin W. Felton, Boston, Mass.

228,344. ROTARY PUMP. — John Hollner, Saunders, Neb.

228,349. SASH CORD FASTENER AND SASH-LOCK. — Edwin V. Heaford, Covington, Ky.

228,369. MANUFACTURE OF PLUMBER'S TRAPS. — John McCloskey, New York, N. Y.

228,379. LOCK. — Christian F. Otto, Zerbst, Germany.

228,384. WINDOW-SCREEN. — Rice Perrin, Springfield, Mo.

228,388. FIREPLACE WATER-HEATER. — Isaac B. Potts, Columbus, O.

228,421. WOOD-BIT. — Lycurgus Thuston, Findlay, Ohio.

228,429. SCREW-THREAD CUTTER. — James C. Williams, Cleveland, O.

9,221. MORTISING MACHINE. (*Reissue*). — Edward H. N. Clarkson, Baltimore, Md.

9,222. SASH-CORD GUIDE. (*Reissue*). — Edward H. N. Clarkson, Baltimore, Md.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since the last report:

Mr. Adler, three-st'y brick building, 308 Howard St.

Gable & Beacham, addition to warehouse on Canton Ave., cor. President St.

Mrs. C. L. McKinn, 15 three-st'y brick and stone dwells., Calvert St., between Eager and Chase Sts.

Herman Meyer, 2 three-st'y brick dwells., Baltimore St., between Exeter and Temple Sts., 20' x 78' each.

SUNDAY-SCHOOL. — The Friends' Gospel Mission is about to build a large Sunday-School on Light St., near Hamburg St., 42' x 120', to be of press brick, with Cheat River stone finish, one story high, for Sunday-School, and the front part to have two stories, the second story to be used as a library and reading-room; cost $10,000. Mr. Geo. Archer is the architect.

OFFICE-BUILDING. — The old and dilapidated building, northeast corner Charles and Saratoga Sts., owned by the Wilson Sanitarium estate is now being torn down, to be replaced by a modern structure. The first story will be used as a store, and the remainder of the building will be used as offices for the Wilson Sanitarium and Fuel Saving Socity. The plans have not as yet been decided upon.

Boston.

BUILDING PERMITS. — *Brick.* — Cor. *Gloucester and Newbury Sts.*, for Wm. S. Rand, 4 dwells., 23' x 45', three stories; Frank Jones, builder.

Wood. — *Forest Hills St.*, for A. D. Weld, Jr., 1 dwell., 50' x 60'; McNiel Bros., builders; Appleton & Stephenson, architects.

Cambridge St., Ward 25, for Wm. Roach, 1 blacksmith's shop, 22' x 35'; C. Marshall, builder.

School St., Ward 23, two dwells., 21' x 55', three stories; J. W. Rollins, owner and builder.

East Sixth St., for J. H. Graham, 1 pavilion, 30' x 45'; Raynor & Flint, builders.

Ruggles St., No. 122, for J. Nichols, 1 dwell., 18' x 22'. J. Jackson, builder.

ALTERATIONS. — The Ballard estate on Washington St., is to be entirely rebuilt for stores and tenements, at a cost of $40,000. The building measures 48' x 125'. Mr. Fred Pope, architect.

OFFICE-BUILDING. — The present estate, corner Devonshire St. and Spring Lane, is being altered for an office-building. The first floor is fitted for the Pacific National Bank. The materials will be brick and brown-stone, and the walls will be 80 feet high, and in Italian Renaissance. The entire height of the building will not be built at present. The estate measures 75 feet on Devonshire St. and 80 feet on Spring Lane. Mr. Wm. Minot, Jr., is the owner, and Mr. Fred Pope the architect. Cost, about $60,000.

Brooklyn.

ALTERATIONS. — *Fulton St.*, cor. Tillary St., raised one-st'y; cost, $4,000; owner, Samuel A. Willoughby; builders, C. Cameron and Wright & Brook.

South Third St., cor. First St., one-st'y brick extension on side, 24' x 78'; cost, $10,000; owners, Havemeyer & Elder; architect, T. H. Havemeyer; builders, Thos. Winslow and J. James.

BUILDING PERMITS. — *Quay St., Nos.* 93 *and* 95, 1 four-st'y brick hay and cotton press factory, 50' x 86'; owner, etc., N. L. Balston.

Monroe St., No. 134, 1 two-st'y brown stone dwell., 20' x 42'; owner, Chas. Kimberly, 152 Monroe St.; architect, Geo. Chappell; builder, C. King.

Myrtle Ave., 4 three-st'y brown stone dwells., 20' x 50'; cost, $4,500; owner, A. G. Van Wagner, 548 Lexington Ave.; carpenter, B. Morgan; mason, N. Wood.

Adams St., 1 four-st'y brick factory, 26' x 50'; cost, $4,000; owner, James Howell, Adams St., near Willoughby; architect, W. A. Mundell; builders, G. Phillips and I. B. Jacobs.

Remsen St., No. 73, three-st'y brown stone dwell., 25' x 58'; owner, Aaron Wright, Ohio; architect, M. J. Morrill; builder, E. H. Day.

Broadway, cor. Myrtle St., 2 three-st'y brick stores and dwells., 21' and 24' 6" x 55'; owner, Frederick Herr; builders, Johnston & Bros.

Chicago.

BUILDING PERMITS. — Le Roy Payne, two-st'y brick livery stable, 94' x 162'; No. 169 to 173 Michigan St.; cost, $8,000.

Wm. McCarthy, two-st'y brick dwell., 24' x 48', No. 407 Taylor St.; cost, $3,000.

N. Johnson, two-st'y brick dwell., 22' 6" x 45', No. 222 Townsend St.; cost, $4,000.

Thomas O'Connell, three-st'y brick store and dwell., 42' x 100', Nos. 365 and 367 Blue Island Ave.; cost, $7,000.

J. Messerole, one-st'y brick dwell., 21' x 42', No. 33 Emma St.; cost, $1,200.

A. Koerner, two-st'y brick dwell., 20' x 56', No. 48 Bunker St.; cost, $3,000.

— Wherle, 5 three-st'y brick dwells., 19' x 55', Thirty-Seventh St. and Vincennes Ave.; cost, $25,000.

E. K. Hubbard, two-st'y brick office, 24' x 40', Robey near Blue Island Ave.; cost, $2,800.

A. Kuchenbeiser, two-st'y brick dwell., 22' x 50', No. 649 Franklin St.; cost, $2,600.

E. K. Rogers, two-st'y brick dwell., 20' x 50', Ontario and St. Clair Sts.; cost, $6,000.

W. T. Baker, three-st'y stone dwell., 50' x 90', Michigan Ave. and Twenty-Third St.; cost, $50,000.

A. E. Walker, three-st'y brick dwell., 24' x 60', Indiana Ave. and Twenty-Ninth St.; cost, $12,000.

J. Steiner, two-st'y brick store and dwell., 30' x 82', Clayton and Morgan Sts.; cost, $5,000.

C. Laux, two-st'y brick dwell., 24' x 42', — Centre St.; cost, $6,000.

C. J. Hull, two-st'y brick dwell., 24' x 53', No. 267 Forquer St.; cost, $3,500.

Conrad Seipp, three-st'y brick dwell., 60' x 41', State and Goethe Sts.; cost, $20,000.

J. Medill, two-st'y brick dwell., 58' x 64', Cass and Ontario Sts.; cost, $20,000.

DEPOT. — The Wabash Railroad officials have closed a contract for building a freight transfer depot on the company's grounds at Forty-First St.

Cincinnati.

BUILDING PERMITS. — W. Stichtenoth, to repair a four-st'y brick malt house, cor. of Twelfth and Clay Sts.; cost, $5,000.

Fred. Otte, three-st'y brick, Hopkins St., between Linn and Baymiller Sts.; cost, $3,000.

John P. Scharr, two-st'y brick, No. 596 West Eighth St.; cost, $4,500.

John Cochnower, two-st'y brick, Grandview Ave., south of McMillan St., Walnut Hills; cost, $6,000.

Kuhlman & Buenning, two-and-a-half-st'y brick, Browne St., between Baymiller and Freeman Sts.; cost, $2,500.

J. H. Walters, two-and-a-half-st'y frame, cor. of Gilbert and Church Aves.; cost, $3,500.

John Winterburn, to repair 2 four-st'y bricks, Nos. 222 and 224 West Pearl Sts.; cost, $2,100.

Cleveland.

FACTORY. — The White Sewing-Machine Co. is building a $3,000 addition to their extensive works on Canal St.

CHURCH. — A Congregational church is to be built on Prospect St., cor. of Perry, this summer; cost, $30,000; Mr. Joseph Ireland, architect.

STORES. — The "Worthington Block," which was destroyed by fire a short time ago, is to be rebuilt.

Indianapolis.

SCHOOL-HOUSES. — B. V. Enos & Son are the architects of the two new school-houses, which are to cost $4,000 and $5,000 respectively.

THEATRE. — Work on the English Opera House has begun, under the charge of Mr. J. B. McFaterick, architect.

DEPOT. — Mr. W. H. Brown, architect, is to build the new freight-house for the I. D. & S. R. R.; cost, $18,000.

RAILROAD OFFICES. — The building of the general offices of the C. I. St. L. & C. R. R. is under the charge of Mr. J. H. Stem, architect.

New York.

ALTERATIONS. — *Lafayette Pl., No.* 16, one-st'y brick extension, 28' x 56', for Russian baths; cost, $15,000; owners, Capes & Ryan; architect, Paul F. Schoen.

West Twenty-Third St., No. 448, three-st'y brick extension, 19' 2" x 37' 6"; cost, $6,500; owner, Z. H. Kitchen; architect; Emile Gruwé.

East Fifty-Fifth St., No. 51, four-st'y brick extension, 15' 4" x 26'; cost, $4,000; owner, Horace White; architects, McKim, Mead & White; masons, J. & W. C. Spears; carpenter, Henry Christie.

West Seventeenth St., No. 22, to be raised to four stories, also two-st'y brick extension on rear, 22' 9" x 5', and interior alterations; cost, $5,000; owner, Henry De Cappet; architects, Gambrill & Ficken.

BUILDING PERMITS. — *Sixty-Ninth St.*, 1 three-st'y brick stable, 25' x 85'; cost, $18,000; owner, H. R. Bishop, 18 Wall St.; architect, John Correja; mason, R. L. Darragh; carpenters, McGuire & Sloane.

West Forty-Fifth St., No. 408, 1 two-st'y brick stable, 25' x 100'; cost, $3,000; owner, John J. Lydecker, 412 West Forty-Fifth St.; architect, Geo. Holzeet.

Third Ave., 1 four-st'y brick store and tenement, 23' x 50' 6"; cost, $7,000; owner, Mrs. Sarah A. Martin, on the premises; architect, Thomas H. McAvoy; masons, J. & W. C. Spears; carpenter, John Knox.

One Hundred and Fifty-Sixth St., 1 two-st'y frame dwell., 16' x 20'; cost, $2,000; owner, Gottlieb Wirth Melrose; builder, John Friese.

Forty-Sixth St., 5 five-st'y brick (brown stone front) apartment houses, each 25' x 58'; cost, each, $15,000; owner, Charles Reilly, 168 East Eighty-Eighth St.; architect, John C. Burne.

One Hundred and Fifty-Eighth St., 1 two-st'y frame dwell., 22' x 30'; cost, $2,200; owner, James F. Thomas, One Hundred and Fifty-Fifth St., near Elton Ave.; architect and builder, J. C. Stichler.

Ninety-Eighth St., one-st'y brick and iron building for gas works, 66' x 70' 5"; cost, $22,000; owners, Knickerbocker Gas Light Co., Second Ave. and Ninety-Ninth St.; architect, Thomas J. Rowland; mason, Wm. C. Whyte; carpenter, S. F. Bartlett.

Broadway, cor. Wall St., 1 nine-st'y brick bank building, 72' 5" x 92' 2"; cost, $450,000; owners, First National Bank and Bank of the Republic; architects, Peabody & Stearns; mason, Robert L. Darragh; carpenters, Morton & Chesley.

One Hundred and Twentieth St., 4 two-st'y and basement brick (brown stone front) dwells., 18' 9" x 45'; cost, each, $6,000; owner and builder, Isaac E. Wright, 153 East One Hundred and Twenty-Eighth St.; architect, J. H. Valentine.

One Hundred and Tenth St., 3 three-st'y and basement brick (brown stone front) dwells., 16' 8" x 50'; cost, each, $10,000; owner, M. J. Moore, 311 East One Hundred and Thirteenth St.; architect, J. H. Valentine; builder, H. Moore.

One Hundred and Fourth St., 3 three-st'y brick apartment houses, 16' 8" x 50'; cost, $7,000 each; owner, A. M. Jenny, 241 East One Hundred and Fourth St.; architect, J. H. Valentine; builder, J. Jenney.

Sixty-Fifth St., 5 three-st'y brick (brown stone front) dwells., 16' x 52'; cost, $7,000 each; owner, Mary Murphy, 100 East Sixty-Fourth St.; architect, S. Murphy.

West Thirty-Sixth St., No. 449, 1 five-st'y brick (brown stone front) tenement, 25' x 65'; cost, $12,000; owner and builder, Andrew Ewald, 423 West Fifty-First St.

Broadway, No. 55, 1 five-st'y brick office building,

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26' 4" x 199' 6" and 201' 6"; cost, $105,000; owner, Henry H. Houston, Philadelphia, Pa.; architects, Geo. Fletcher Babb and Walter Cook; mason, John J. Tucker; builders, Morton & Chesley.

Fourth Ave., cor. Eighteenth St., 1 six-st'y brick hotel, 53' x 136'; cost, $225,000; owner, Joseph Wehrle, Belvedere Hotel; architect, Emil Gruwé.

Monroe St., Nos. 126, 128, 132 *and* 134, 6 five-st'y brick tenements, each 15' x 75'; cost, each, $7,000; owner, Joseph G. Harrison, 329 West Thirty-Fourth St.

Vandewater St., No. 9, 1 two-st'y brick store, 25 ft. front, 11 ft. rear, 100 ft. deep; cost, $6,000; owner, J. H. Haulenbeck; architect, E. Sniffen.

Norfolk St., Nos. 102, 104, *and* 106, one four-st'y and attic public school-house, 65' x 90'; cost, $60,000; owner, Corporation of the City of New York; architect, D. I. Stagg.

Apartment-House. — On Fifty-fifth St., corner Seventh Ave., a five-story apartment-house, in the Elizabethan style, to be of brick with stone finish, is to be built for Mr. Ed. Clark, President of the Singer Sewing Machine Company, at a cost of about $100,000. Mr. H. J. Hardenbergh is the architect.

City Work. — For the city of New York the following work is under progress, or about to be started: On Ward's Island, a west wing to Insane Asylum, of brick, with Ohio-stone finish, 80' x 200', to cost about $150,000.

On Blackwell's Island, an addition to the Retreat Building, of brick and stone, to cost $30,000; a brick laundry building for Charity Hospital, to cost $15,000; two pavilions for the Almshouse, to cost $24,000; two pavilions for the Maternity Hospital, to cost $15,000; a fire-engine house, to cost $15,000; bath house, etc., for Men's Almshouse, to cost $3,000; addition to Lunatic Asylum, of laundry, kitchen, and engine house, to cost $12,000.

On Randall's Island, a brick quarantine building, to cost $10,000.

On Hart's Island, a pavilion for Insane Asylum, to cost $13,000; for Bellevue Hospital a new pavilion, to cost $25,000; also an office waiting-room and Coroner's Jury room with subterranean morgue on a new plan, to cost $15,000. Mr. Joseph M. Dunn is architect for all the buildings.

Market. — New buildings are being put up at Burling Slip, to accommodate the occupants of Fulton Market, while that structure is being rebuilt.

Philadelphia.

Building Permits. — *Latona St.*, between Thirtieth and Thirty-First Sts., 7 two-st'y dwells., 14' x 28'; Alex. Wilson, owner.

Sixteenth St., north of Columbia Ave., 5 three-st'y dwells., 17' x 60'; Jos. S. Albright, owner.

Adams St., cor. Taylor St., two-st'y dye-house and addition; Firth Bros. & Co.

Sixth St., north of Dauphin St., three-st'y dwell., 16' x 56'; S. R. Stewart, contractor.

Marshall St., south of York St.; 2 two-st'y dwells., 16' x 30'; S. R. Stewart, contractor.

Adams St., southwest of Church St., three-st'y factory, 54' x 144'; C. S. & J. P. Jones, owners.

Twenty-Seventh St., south of Poplar, ice house, 38' x 65'; J. B. Doyle, contractor.

Chestnut St., No. 923, four-st'y back building, 16' x 100'; J. B. Doyle, contractor.

Knorr St., north of Filmore, three-st'y dwell., 20' x 36'; J. K. Knorr, owner.

Clearfield St., cor. Mercer St., 5 two-st'y dwells., 13' x 40'; J. K. Knorr, owner.

Thompson St., north of Clearfield St., 4 two-st'y dwells., 13' x 40'; J. K. Knorr, owner.

Dock St., No. 104, new front; A. Casely, contractor.

Fortieth St., cor. Locust St., two-st'y building, 11' x 35'; Jacob Myers, contractor.

Fairmount Ave., between Twenty-First and Twenty-Second Sts., two-st'y stable, 32' x 46'; A. A. Campbell, contractor.

North Twenty-Third St., Nos. 214 *and* 216, three-st'y store-house, 30' x 132'.

Linn St., between Twenty-Second and Twenty-Third Sts., three-st'y factory, 49' x 140.

Baltimore Ave., Angora, three-st'y factory, 75' x 140'.

Montgomery Ave., cor. Cadwalader St., five-st'y factory, 52' x 90'.

Division St., cor. Thompson St., two-st'y factory, 60' x 140'.

Franklin St., north of Columbia Ave., one-st'y factory, 40' x 240'.

Factory Buildings. — Seven buildings are being erected by Horner Bros., for the manufacture of carpets, at the northwest corner of Fourth St. and Lehigh Ave. as follows: two-st'y office, 91' x 22'. Six-st'y warehouse, 55' x 153'; contains elevator, and tank capable of holding 12,000 gallons of water, in case of fire; stairs fire-proof; buildings are of pressed brick, with granite finish. Dry house, 43' x 40'. One-st'y dye-house, 103' x 47'; stack 125 ft. high. One-st'y filling and sizing house, 80' x 42'. Two-st'y engine-house, 35' x 33'; beams and columns of wrought iron. One-st'y weaving-room, 278' x 85'; cement floor. Entire cost about $100,000; Walter H. Geissinger, architect and superintendent.

St. Louis.

Building Permits. — Thirty-five permits have been issued since our last report, three of which are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows: —

Owners Name.	Use.	Stories.	Rooms.	Cost.
E. F. Gleason,	Dwell.	2	6	$3,700
J. T. Drummond,	Fact'y	6	6	9,000
Mary Stuede,	Dwell.	2	8	3,000
J. Frein,	Ice House	1	1	6,000
Mrs. A. Cherot,	Dwell.	3	8	3,000
Jno. Schop,	Stores	3	3	7,500
W. H. Chappell,	Chem. Wk's	1	1	4,000
H. Lyons,	Dwell.	2	9	4,000
Franz Krein,	Ware H'se	2	4	7,000
Lindell Railway Co.,	Stable	2	4	12,000

General Notes.

Adams, Mass. — H. T. Crandall is to build a six-tenement brick block on Centre St., corner of Crandall St.

Adrian, Mich. — Mr. M. L. Smith, architect, of Detroit, is preparing drawings for the Reform School for Girls, which will cost $30,000.

Albany, N. Y. — The sum of $100,000 has been appropriated to complete the Senate Chamber of the new Capitol. The bill further provides that the Senate Chamber and Governor's room shall be ready for occupation by the first of next January. The sum of $1,500,000 is appropriated, in another bill, to continue work upon the building generally.

Altoona, Pa. — Mr. F. C. Withers, of New York, has drawn plans for St. Luke's Church. It is to be of stone, and will have seating accommodations for 500 persons.

Anderson, Ind. — B. V. Enos & Son, architects, of Indianapolis, are to build a block of stores, which will cost $5,000.

Appleton, Minn. — A Catholic church is to be built here.

Blackstone, Mass. — Blackstone has voted to build a new town poor-house; cost, $45,000.

Brighton, Mass. — The management of the Brighton National Market Bank have decided to build a new bank building near the Brighton railroad station. The new building is to be of brick, 33' x 43', one-story high; cost, $6,000. Work will begin as soon as the contracts are awarded.

Bloomville, O. — Mr. N. B. Bacon, of Toledo, O., is preparing drawings for the new town-hall which is to be built of brick and stone.

Cleveland, O. — Proposals for building an addition to the Hicks St. school-house will be received June 14.

Columbus, Ind. — The plans and specifications for McCormick & Sweeney's new hotel have been received. The building will contain sixty-five rooms and will be three stories in height.

Corsicana, Tex. — The new court-house is to cost $40,000.

Detroit, Mich. — The corner-stone of the Universalist church was laid June 1.

Easton, Pa. — Work has commenced on the foundation walls for the new church edifice for St. John's Evangelical Association.

Frankfort, Ind. — Wm. Wolever is preparing to build an Italian villa on Jackson St., from plans prepared by J. W. Hammond, architect; contract not let yet.

Mr. Hammond has also made plans for a two-story cottage, cost, $2,000, for Prof. R. S. Boone.

Hagerstown, Md. — Mr. E. T. Littell, of New York, has drawn plans for a memorial tower and spire for St. John's Episcopal Church. It is to be built of stone, at a cost of about $5,000.

Hartford, Conn. — Mr. F. C. Withers, of New York, is preparing plans for a handsome brick and stone residence, to be built for Dr. G. Pierrepont Davis.

Holyoke, Mass. — T. L. Keough is to build a 28' x 55' brick block on Depot Hill. It will be three stories high, to contain six tenements.

Jefferson, Ind. — The United Brethren are building a church, 32' x 58', with tower; cost, about $4,000; complete, with bell; J. W. Hammond, of Frankfort, Ind., is the architect.

Juliette, Ind. — Mr. J. H. Stem, architect, of Indianapolis, is to build the new church here.

Kansas City, Mo. — A frame house for M. Benas, Esq.; from plans by F. T. Camp, architect, New York.

Kensington, Ill. — The Allen Car-wheel Works buildings are being rapidly pushed forward.

All that the Pullman Company is doing is putting up a frame structure, 62' x 43', as a boarding-house.

The foundation for the new car-works will be begun soon.

The Michigan Central is accumulating the material for its new freight depot, which is to be 800' x 24', and two stories high.

Lindsay (Ontario), Can. — Town hall, red and white brick and stone; F. T. Camp, architect, New York.

Residence, Wm. Duffus, Esq.; F. T. Camp, architect.

Bids and Contracts.

Columbus, Ind. — The contract for building the American Starch Works has been awarded to Farman & Pearce, of Indianapolis, their bid being $36,221; McCormick & Sweeney's bid was $39,000. The works are to be completed by September 15th. The above figures are for the work only, the company furnishing the brick and timber for the corn crib.

Harrisburg, Pa. — The contract for Harris Park School has been awarded to Mr. Joseph Ball, of Harrisburg, for $16,875; Mr. Frank E. Davis, of Baltimore, is the architect.

Jackson, Minn. — J. M. Daniels has the contract for building a $1,500 Methodist church.

Middletown, Conn. — The complete list of the awards for building the addition to the Insane Asylum is as follows: mason work, Watson Tryon, Enfield, $52,557; carpenter work, J. W. Hubbard & Co., Middletown, $32,811.63; slating, M. F. Clark & Co., Hartford, $4,700; plumbing and gas fitting, George Maehl, Hartford, $3,720; boilers, Peter Amerman, Hartford, $1,750; steam heating, Walworth Manufacturing Company, Boston, $7,996.75. Jasper D. Sibley, Middletown, is to be foreman of the work.

Philadelphia, Pa. — Proposals for iron work were lately received as follows by the Commissioners for the new Public Buildings: Jones & Benner, $76,890; Phœnix Iron Company, $68,750; Stewart & Stevens, $77,952.80. The contract was awarded to the Phœnix Iron Company.

Upper Marlborough, Md. — Mr. Joseph Williams has been awarded the contract for the Court House in Prince George County, for $15,800; Mr. F. E. Davis, of Baltimore, is the architect.

West Warren, Mass. — Flint & Co., of Monson, have the contract for the new mill at West Warren, and will put on about one hundred men from the Willimantic mill, July 1. The structure is to be 316' x 70', with tower and entrance at each end.

Industrial.

Auburn, Mass. — Dunn's Mills are to be rebuilt, for the manufacture of shoddy, by the New England Bedding Co.

Methuen, Mass. — The stockholders of the Arlington Mills have voted to build a fine cotton warp mill, of thirty thousand spindles.

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THE struggle between Mayor Cooper and the Superintendent of Buildings in New York still continues. In reply to the mayor's summons to appear before him to answer certain charges, Mr. Dudley obtained a writ of prohibition which has for the present stopped this proceeding, and by a similar writ prevented the Fire Commissioners from taking possession of his office and papers, as they were authorized to do on the coming into effect of the new statute for the consolidation of the Fire and Building Departments. The ground on which the execution of the statute is resisted is its unconstitutionality under a recent amendment to the organic law of the State, which prohibits the change of any existing statute except by an express act reciting the law to be amended. This precaution was not apparently observed in the Public Burdens Act, which certainly amends the statute which created the Building Department, and it is therefore claimed to be void. Meanwhile, the Fire Commissioners have appointed Mr. Thomas McAvoy as superintendent, but have forborne to take actual possession of the office until a decision has been reached on the legal points involved. This will take some time, and Mr. Dudley has, it is said, improved the opportunity to take a voyage to Europe. We trust that Mr. McAvoy, as successor to Mr. Dudley, may prove to be the right man in the right place. He is "endorsed by the Fire Commissioners," and according to the New York papers, "nothing is said against him;" which does not imply that he has as yet attained the conspicuous professional reputation which he will have a chance to earn, and which should belong to the man who is to fill a post of such grave responsibility. If the Department, by approving a plan, relieves its author of all accountability for it, as seems to be now the theory, certainly none but an architect or engineer of the first class can properly fulfil the duties of the office. One of the first exercises of the new incumbent will be the criticism of the plans for the vast Barnum building, two acres in area under a single roof, and five stories high. It would tax the science of the best of living architects to pass an authoritative judgment on such a design, and the public will not, we hope, forgive another exhibition of careless ignorance.

A YEAR or more ago a scheme was talked of for building on the site of the present Madison Square Garden a vast theatre, museum, and place of varied amusements, and plans of the building were drawn by Mr. A. H. Thorp, if we recollect rightly, but nothing was done. The late sad occurrence seems, however, to have made a complete transformation of the place desirable, and the ground is announced to have been definitely sold to a company which will at once commence the erection of a building substantially as originally proposed. This time the name of Mr. P. T. Barnum is used to give lustre to the enterprise, and Mr. Vanderbilt is said to be a large stockholder. The situation of the building will be all that can be desired, and the financial success of the enterprise should be reasonably certain. In the present state of public feeling, it seems probable that special care will be urged upon the proprietors in guarding those who will frequent the place against the dangers of fire and bad construction; if so, the circumstances will be particularly favorable.

AN insurance case has just been decided, after five years litigation, of importance to all who hold policies. In 1875 the Oceanic Hotel, at the Isles of Shoals, was destroyed by fire. Some time previously the owner had procured a policy on the building in the Hudson Insurance Company, transacting the business through brokers in the usual manner. Not long after, the Hudson Company became dissatisfied with the risk, and ordered its agent to reduce the amount or have the policy cancelled. The agent communicated with the representatives of the proprietor, offering to cancel the policy and reinsure the building in the Lancashire Company, for which he was also agent, using the return premium from the Hudson to pay for the insurance in the new company, and his proposition was accepted, and the policy forwarded to him for the purpose of making the change. On receiving it, he immediately wrote "Cancelled" across it, but put off the fulfilment of the rest of his agreement—the taking out of a new policy in the Lancashire—until a more convenient time. Before that time arrived, the hotel was burned. The Hudson Company claimed that the policy was effectually cancelled, although no reinsurance had been made, and forwarded the return premium, with which its agent had undertaken to pay for new insurance, as being all that was due from them. Naturally, the owner of the building refused to receive it, and on this ground the court decided that the cancellation was incomplete, and that the Hudson Company was still liable. One would think that the fact of the owner's having acted in perfect good faith, in returning his policy to the agent of the company only for the sake of reinsurance, would necessarily imply that the insuring company was still liable until its agent had completed his part of the transaction, whether the premium returned after the loss had been accepted as an instalment on the amount due, or not; but underwriters manage to spread so many snares to entrap their patrons that it is useless to rely on honest intentions.

IT is seldom that a competition is decided without complaints of unfairness from some quarter, and that invited for the new Washington Monument at Philadelphia seems to have been no exception to the rule. The committee of the Society of the Cincinnati, which had the matter in charge, has as yet made no report of its proceedings, but it is inderstood to have accepted a model submitted by a Prussian sculptor, Seimmering. It is now asserted that Seimmering's design was copied, or rather appropriated, from Rauch's monument to Frederick the Great, in Berlin, with a few Indians added to give local color, and a little change in the grouping. How this may be, it is impossible for us to say at present, but we hope there is no danger of the Society's making itself ridiculous by erecting a second-hand memorial. A more serious charge, which is made in conversation by the disappointed competitors, is that the accepted design violated the conditions set forth in the published circular inviting designs. If this should prove to be true, there is no question of their right to have the award set aside by process of law. Committees of this kind cannot be too careful in drawing up the terms upon which competitive designs are invited, or in keeping rigidly to them in their selection. It is well established that the stipulations of the circular of invitation form the terms of a valid contract between the party issuing it and each competitor who makes and sends in a design in accordance with it, and an award in violation of the terms can only be made at the risk of having to pay damages to all those who were careful to fulfil strictly their part of the agreement.

MOST of our readers have before this learned of the sad fate which is only too surely proved to have overtaken one known to a very large number of them, Mr. Hubert M. Warren, of the Warren Chemical and Manufacturing Company, who was a passenger on the steamer Narragansett on the night of the 11th. It is ascertained that he occupied a state-room aft of the wheel-house, in that part of the boat struck by the prow of the Stonington, and in the terrible violence of the collision it is hardly possible to doubt that he was one of the first victims. No one with whom Mr. Warren's very extended business relations have brought him in contact can have failed to be im-

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pressed with his kind and modest ways, his devotion to his work, and the perfect integrity and frankness which characterized his dealings, and many of those whose acquaintance with him was of the slightest will feel sincere sorrow at his loss, and deep sympathy for his large family of children, now doubly orphans.

We have received the catalogue for 1879–80 of the Illinois Industrial University, at Champaign, in that State, of which we have repeatedly had occasion to speak. It is pleasant to find that the institution counts already four hundred and thirty-four students, of whom we find twelve to be pursuing the four-years course in architecture, one of the most extensive and thorough of those included in the university scheme. We are sorry to find no students mentioned as pursuing the Builders' course, a special selection of studies from the architectural curriculum, occupying but one year, and well suited to the needs of a class of men who feel the want of training of this kind more keenly, and can profit more by it, than almost any members of the community. In the Architectural course, which forms a division under the head of Engineering, if anything, the technical part of the course, as compared with the strictly æsthetic, appears to us perhaps rather too prominent; not that we would wish the graduates in architecture to be ignorant of the least important detail of building work, but because we should regret anything which might lead them to forget in practical details the preëminent claims of their profession as a fine art. For the same reason, we confess having misgivings as to the utility of some of the shop practice which forms a part of the exercises. Admirably calculated as this training is to form good superintendents, or clerks-of-works, the actual practice of veneering and dovetailing can do little to develop the artistic sentiment upon which success in the profession must more and more depend, and it is questionable whether some students may not be led by an aptitude for this kind of technical work, which might be of great use in another profession, into embracing one which requires mental qualifications of an entirely different kind, and thus wasting their lives in unsuccessful competition with those for whom education and endeavor might have done less, but nature more. The study of architecture purely as a fine art has as yet hardly been thought of in this utilitarian country, but architects feel every year more strongly the inadequacy of the artistic as compared with the material training with which their juniors come to them furnished, and there is, or soon will be, a field of great usefulness for an institution, supplementary perhaps to the technical schools, where architecture shall receive attention, not as a branch of engineering, but as correlative with painting, sculpture and music.

Those who have had occasion to import works of art will remember the vexatious and often ludicrous annoyances caused by the imposition of heavy duties, assessed in a manner which rendered their collection needlessly difficult, and their evasion sometimes injudiciously easy. A favorite story of General Butler's is to the effect that a large metal-importing house in New York, once observing that the patriotic framers of the tariff prescribed that works of art by American sculptors residing abroad should be admitted into their native country free of duty, turned this provision to their private benefit by engaging an American "sculptor" on the other side of the water, whose duty it was to melt down the lead which his employers desired to import, and cast it into what were by courtesy supposed to be statues of Washington, which being "works of art" passed the American custom-house free. Lately, a gentleman who desired to import some Tanagra figurines, inquiring as to the duties, learned that they would be classed with pipes and spittoons as "manufactures of burnt clay," and subjected to an *ad valorem* duty of some thirty per cent. We should judge that it would generally be advantageous to the importer to leave the valuing of goods of this class to those who administered the tariff, and perhaps it is owing to the unaccustomed strain thus thrown upon the faculties of the appraisers that a bill has recently passed both houses of Congress under which classical antiquities are to be admitted free of duty.

The competition question continues to engross the attention of the English architects. At the last meeting of the Institute which we find reported, a memorial, or rather two distinct memorials were presented, signed by no less than twelve hundred and seventy-four architects, praying that action might be taken for the regulation of these trials of skill between members of the profession. In accordance with a general understanding that it would be well not to attempt too radical a reform at first, for fear of failing altogether, most of the memorialists insisted principally upon one point, that of the employment of an expert adjudicator as a condition without which no reputable practitioner should enter any competition. Those eminent and public-spirited architects who originated this movement have reason to be gratified at the enthusiasm with which it has been taken up in the profession, and some definite result may be looked for. The Royal Institute of British Architects, some weeks ago, appointed a committee, consisting now of twenty-two members, to consider the matter during the interval while the memorial was circulating for signatures, and the document having now been completed and presented, the committee will be called upon to report, and their report and the prayer of the memorialists will be considered together. Among the signers of the paper prepared for members of the Royal Institute (printed in our issue for May 1) were one hundred and fifty-three Fellows and a somewhat larger number of Associates, and a document almost precisely similar was signed by nine hundred and sixty-two architects not members of that body. The President, in receiving the memorial, spoke of it as one of the most important communications ever made to the Council of the Institute, and the *Builder* goes so far as to reproduce the names of the signers at length, in order, as its editor says, "that the world at large may see as much as possible of the signs of better things to come."

The Cape Cod Ship-Canal, an undertaking of considerable importance not only to Massachusetts, but to other States on the Atlantic coast, seems likely to be soon in train for actual construction. A charter for the building of the canal was some years ago granted to a corporation which did nothing but make a few surveys and keep others out of the field. Last winter, however, a new association was formed, which applied for another charter, proposing to complete the work at once, and the Legislature granted their request, with the condition that the new corporation should not come into possession of the franchise granted to the old company, provided the latter would make and record before July 1, 1880, a new location for the canal, and would furthermore raise a subscription of four hundred thousand dollars, one quarter of it actually paid in, and expended on the work, before the first of the ensuing November. Stimulated by the prospect of losing their charter, the old company has made great exertions, and seems in a fair way to fulfil the conditions imposed upon it. A ship-canal at this point may be expected to exert a strong influence on the course of future navigation. For coasting vessels, especially, the shortening of the distance between the harbors of New England and the Provinces and the ports of the Middle States will be of importance, while the risks which attend the winter passage around the Cape, and through the exposed Vineyard Sound, will be in a great measure avoided. The great future value to coast-wise commerce of the singular line of sheltered sounds, protected by sandy islands, which extends along so great a portion of our Atlantic coast, is hardly yet appreciated. Even at present, boats can float in smooth water by means of sounds, rivers and canals from Connecticut nearly to South Carolina, and it can hardly be many years before the line is much extended.

One more great Asiatic country seems to be on the point of invasion by Caucasian curiosity and avarice. The great peninsula of Corea, half-way between Japan and China, and containing a population half as large as that of Japan itself, has long been closed as rigidly against foreigners as were once the neighboring nations. Very lately, however, it has been reported that intestine political disturbances had prepared the way for a different state of feeling toward Europeans, and the Chinese Government, perhaps in the hope of gaining some advantage in its struggle with Russia, is said to have counselled the opening of its vassal kingdom to strangers. In accordance with this information the United States frigate Ticonderoga has been detailed, under Commodore Shufeldt, to proceed to Corea, and Mr. Mangum, the American Consul at Nagasaki, has been sent with the frigate as diplomatic agent for the United States. The result of this expedition will be looked for with interest. Another such success as the Perry expedition to Japan is not to be hoped for, but Corea is said to be a rich and fertile country, and the Western nations will be glad of another opportunity to exchange the blessings of their civilization for a suitable equivalent in cash or merchantable goods.

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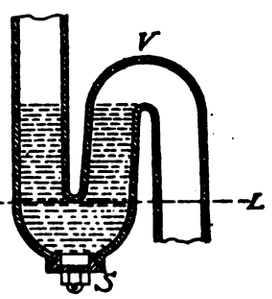
HOW TO LEAVE PLUMBING FOR THE SUMMER.

JUST at this season, when thousands of the inhabitants of city and suburbs are closing their houses, to leave them for a sojourn of two or three months in the country or at the seaside, some hints as to the danger of leaving plumbing work to itself for so long a time, and the modes of providing against this danger, will be timely. Few people need to be told that a week or two of hot weather is enough to evaporate the sealing water from the traps of wash-bowls, baths, or even water-closets, leaving an open passage from the drains into the house, through which sewer vapors flow freely, often saturating curtains, carpets and furniture with their faint, sickly odor, to salute the family on its return home in the autumn. When we reflect also that the reopening of the house usually takes place in the most fatal month of the whole year, September, when the system is especially susceptible to zymotic influences, and that the return of delicate persons from the fresh country air to the stifling atmosphere of the city is generally attended with a certain depression of the vital powers, the danger of sudden exposure to the influence of a house where foul vapors have for months been floating undisturbed, and their deposit accumulating and corrupting in the darkness, is evident, and the trifling care which is necessary to give reasonable security against at least the unchecked circulation of foul air in the rooms will be well repaid.



S-Trap.

An inspection of the cupboard under an ordinary wash-bowl will teach quite enough of the principles of plumbing to enable the householder to proceed intelligently. He will here usually see the waste-pipe descending a few inches below the plug, there to be joined by another pipe, which, if he looks sharply, he will find to be connected with the little cluster of holes in the basin through which the water overflows when the basin is too full. Below the junction of the waste and overflow the pipe makes a bend, generally with a brass screw or nut in the bottom, at S; this is the trap. Beyond this, the pipe probably disappears through the floor, but if he could trace it farther, he would find it passing straight to the drain. In the bend of the trap lies about half a pint of water, as the figure shows, and this water forms the only barrier between the rooms and the deadly gases which fill the pipes beyond. If his house is a very modern one, he may notice a ventilating pipe issuing from the point V, or possibly a little cistern, called a round trap, may take the place of the bend in the pipe. Neither of these will alter the precautions to be taken: the ventilated trap will dry out more quickly, and the round trap less so, than the plain bend, but there is no other difference so far as we are at present concerned. If the house is an old one, he may very likely see the basin waste passing off out of sight without any sign of a trap. In this case it is probably carried into another larger trap, usually that of a water-closet, and the same water which seals the large trap seals also the smaller one. This will also make no difference in the measures we are to take.

It is evident by the figure, that if the water held in the trap should evaporate down to the level LL, the vapors on the lower side would at once begin to slip between the bend and the surface of the remaining water, and would pass more and more freely as the water diminished. Very often not more than a teaspoonful of water need be evaporated before this action begins, and in any case it is but a matter of a few days. Some means must be found for preventing the gas from issuing into the rooms after the inevitable drying up of the water seal. There are two paths by which it can so escape; the water-plug or valve, and the overflow. The overflow can be closed by pasting several thicknesses of paper over the cluster of holes in the basin, — by beginning with a soft, thin piece, it can usually be made to stick, — or by closing all the holes with small corks. The last is the more reliable way. The waste-valve or plug should then be closed, and the basin drawn nearly full of water: if the water does not run off, however slowly, the plug is tight, and the basin may be left without further anxiety. The water should be allowed to remain, as it will serve to hold the plug down by its weight, and to prevent some kinds of plugs from drying. If the plug or valve prove not to be tight, another cork should be tightly fitted to the waste. No further precautions will be necessary.

Bath-tubs should receive precisely the same attention. The overflow holes, usually being of irregular shapes, can hardly be stopped with corks, but two or three thicknesses of stout paper stuck on with copal varnish rather than gum will answer admirably. The waste will be tested and secured as before.

Water-closets are more dangerous, and more difficult to seal than the others. The trap, which is a very large one, and usually concealed between the floor timbers, can be reached through the receiver of the closet and closed by a cork, which must usually be four inches in diameter; but this is a disagreeable operation, and still, with most closets, leaves the foul interior of the receiver above the trap ready to scatter the seeds of disease as soon as the water in the movable pan which closes the orifice of the basin has evaporated. The best way is, therefore, to flush the closets with plenty of water, then letting the handle fall back into its place, dip out with a sponge most of the water in the pan, and fill it up with sweet or lard oil until it is heard dripping into the trap below.

With hopper-closets, such as are often set for servants' use, and may in general be distinguished by having no movable pan closing the bottom of the basin, the latter opens directly into the trap, and the best means of protection is, after well washing out the basin, to dip out half a pint or so of the water in the trap by means of a sponge tied to the end of a stick and dipped into the trap through the basin, afterwards filling up with oil until it is heard overflowing.

Kitchen sinks and laundry wash-trays next need attention. The waste plugs of the wash-trays should be closed, and tested by filling with water, or fitted with corks, and the overflows, if any exist, should be pasted over with paper, or corked. The copper boiler must also be looked after; some are fitted with waste plugs, like the wash-trays, and should be similarly treated. Sinks, and slop-sinks, which have simply a strainer at the lowest part, may have this strainer closed by a piece of soft leather or rubber, held down by a heavy weight, or putty may be spread over it.

Finally, the tanks must be looked after, beginning with the large one which is usually to be found in the attic. This will have an overflow and a waste plug. The waste plug, or the valve which supplies its place, is almost always tight, and beyond seeing that it is in its place, no further care need be taken of it, except to fill the tank partially with water if it should be empty. The overflow may be in the form of a hole an inch or so in diameter, in the side of the tank, near the top, which should be tightly closed with a cork; or it may take the shape of a "standing waste," consisting of an open copper or brass pipe standing upright in the tank, the mouth of which is to be corked as before. In case of doubt as to the position of the overflow, it may be distinguished by holding up the ball of the ball-cock and letting the water flow in until it is seen to be running off. The level of the surface of the water will then point to the overflow pipe.

There will also be small cisterns placed above most of the better class of water-closets, and these may possibly have overflows, which, if they exist, should be corked.

This will include all the plumbing appliances usual in dwelling-houses, which need protection. Any others, such as foot-baths, urinals, etc., can be treated upon similar principles. In general, overflows need to be even more carefully protected than waste-pipes, since the latter have usually a plug or valve which affords at least some protection, even without the help of the trap, while the former, as soon as the trapping water is evaporated, furnish a wide passage for foul vapors.

It is presumed that the soil-pipes, drains and apparatus are free from any leakage that the peppermint test will show, and in good condition, these directions being only intended to provide against the inevitable consequences of leaving ordinary well-constructed plumbing appliances to take care of themselves for a length of time in warm weather. After the traps have been flushed as directed, and water enough drawn in the baths and basins to cover the plugs to a good depth, the street supply may be cut off if desired, and the pipes drained. There is no advantage, but rather disadvantage in this, except that it saves some slight risk of damage if leakage should occur. If any rooms are to be occupied during the summer, a certain portion of the plumbing may be left in its usual condition, care being taken to use water frequently in all such apparatus, to be sure of keeping the traps supplied, and on returning at the end of the season, water enough to replenish the traps should first be drawn in all the bowls, baths and sinks, throughout the house, and the corks or paper seals of the overflows *then* removed; otherwise there will be danger of flooding the rooms. Where oil is used in water-closet traps and pans, it should be inodorous, as its surface is exposed; and a considerable quantity of water must first be dipped out, to be replaced with the oil, otherwise this will flow away over the surface of the water, without forming a thick coating upon it, as it should, to prevent evaporation. For the same reason, it is useless to pour oil down into an inaccessible basin or bath-trap, already full of water; it will simply run over the top of the heavier water, and be lost in the drain. If such protection is desired, the brass screw at the bottom of the trap should be loosened with a wrench, and a portion of the water withdrawn at that point. This will leave a space between the water surface and the point of overflow, in which the oil can remain.

The means of similarly protecting the plumbing work of country houses, exposed to danger of freezing through the winter, may form the subject of a subsequent paper.

THE CHRISTMAS-CARD COMPETITION, NEW YORK.

IT is doubtless well known to the readers of the *American Architect* that an exhibition has just been held at Mr. Moore's gallery of the designs, — more than five hundred in number, — which had been entered in competition for prizes offered by Mr. Prang. The prizes were so munificent, — $1,000, $500, $300, and $200 respectively, — that it was expected numerous artists of standing would compete, and that the exhibition would be one of great interest. For although the article in question was intrinsically of minor importance, it was, nevertheless, one to the making of which might be applied the greatest skill of design and the utmost play of fancy, and for which every sort of treatment would be appropriate, from the extreme of so-called representative art on the one hand, to the extreme of so-

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called conventional decorative art on the other. It was supposed, furthermore, that this decorative work, of which there has been so much talk in recent years, would come very strongly to the front, and that we should have convincing proof of the good accomplished by our numerous "Decorative Art" societies in fostering it. I am sure I am expressing the general sentiment when I say that the public was disappointed in its expectations. The average level of the work was very low. One was driven to question whether it could have been lower before the days when decoration and, indeed, art in general was so much talked about. And the very best of the designs, while, as I understand, Mr. Prang is pleased with them as appropriate for his purpose and likely to come out well from the hands of his lithographers, were not very inspiriting as works of art in themselves considered. It is as works of art chiefly that the general observer will be interested by a report of them, — as signs of the average ability of our artists, professional and non-professional, in the minor provinces of design. As I have said, their contemplation in this light led to no very satisfactory conclusions. One would think that the much that has been said and written about art of late years would at least have brought home to uneducated and incapable people the fact that they were uneducated and incapable, even if it led them no ways on the road toward better accomplishment. But a large number of these designs looked as if the competitors had never touched brush or pencil before. A lot of children in untrained nursery experiments might be expected to do better. It was wonderful to think that such productions could have been sent in to the judges in the faith, of course, that they had at least a chance of being rewarded. Passing to the designs that were not beneath criticism, a large number were found to consist of simple floral subjects such as the world already possesses by the thousand, not even characterized by any effort at novelty of arrangement or at the representation of unfamiliar blossoms. Even roses which are difficult of execution were conspicuous by their absence, while field flowers, pansies, and the like, mustered in large quantities. There were one or two moderately good pictures of these last-named flowers, — otherwise nothing in this line deserved particular mention. Of landscape designs there were some that were well-done, though it is hard for any such to be very appropriately applied to Christmas-cards.

If we pass now to the figure subjects, I may say without fear of erring on the side of severity, that not a dozen draughtsmen were represented who had drawn the figure fairly well, and scarcely three or four who had drawn it really well. Mr. Sandier who took the second prize, and the "Unknown" to whom the third was awarded, had certainly done so. One was inclined to wonder, at first sight, why the principal prize had not fallen to one of them, instead of to Miss Emmet, whose work was certainly less well executed. But the jury, — most capable judges, who were, of course, as well aware of this fact as any of those who questioned their decision, were not instructed by Mr. Prang to award the prizes solely with reference to perfection of execution, but also, and chiefly, — though of course by no means exclusively, — with reference to the subject-matter and conception of the card as original and appropriate to the Christmas season. This was, it need hardly be said, entirely proper, and must have been well understood by the competitors from Mr. Moore's circular. From this point of view Miss Emmet was well entitled to her success. There was no card in the exhibition which showed as much as this one that special thought had been given to the subject and some power of composition applied to its development. The central rectangular division of the design represented a group of surpliced choristers on a gold ground. A wide, dark border encircled this, ornamented by a vine of passion-flowers, and, in the left-hand lower corner, by a shepherd and his sheep, greeted by an angel in the corresponding upper corner. Mr. Sandier's designs were, as I have said, most beautifully executed. He is a well-trained draughtsman who was, I believe, with M. Viollet-le-Duc, and is now chief designer for Mr. Herter of this city. No fault could be found with the drawing or finish of his delicate little figures, but they all bore the stamp of the professional decorator, in their scheme of color which was kept in one or two tints, and in their lack of any special appropriateness to the occasion which had called them forth. The prize card, in oil, showed a single greeting figure, and was all in scarlet and gold. His other two, in *aquarelle* if I remember rightly, were frieze-like rows ot little figures, that would do excellently well, if magnified, for the border of a wall-paper. There is no doubt that they showed a far better trained eye and hand than Miss Emmet's, but in all that pertained to the *thinking* part of the subject, if I may so speak, hers was superior. And I am much mistaken if, when they all come to be reproduced by the same process, it is not found the most satisfactory. Miss Emmet has done other things that show her powers to better advantage; and when grace of fancy and good taste are native, and a desire to excel by honest work has been proven, technical perfection will not be long of acquisition.

The third prize was awarded to a card showing, in a rather stiff arrangement, an infant Christ in the manger on a dark blue background, with rows of well-drawn cherub heads in the border. The design was appropriate, if not indicative of much originality, and should print exceedingly well. Miss Morse, who took the fourth prize, showed three cards done in water-colors and in pale tints, not well-drawn and not original, — pretty, but suggestive of much English work that we are familiar with. It was hard to see why she had been rewarded to the exclusion of one or two others, — notably of the author of the designs whose motto ran "Is it well done?" — designs which showed simple but effective large figures. Some well-executed work was signed "To be or not to be," but the subjects were so confused as to be hardly clear even with the help of a long written explanation.

The best comic design was one called The Modern Santa Claus, representing a negro footman laden with toys. It was curious to see how decorative an effect was produced by so simple a device as placing his smiling face against the centre of the big bicycle-wheel he was carrying.

I do not think that very many professional artists entered the competition. One felt certain of recognizing Mr. F. S. Church's touch, however, and Mr. Hamilton Gibson's. And there were, moreover, three exquisite designs to be seen which were unlike anything else on the walls, and unlike the work of any one else with whom I am acquainted, except Mr. Tiffany. They were purely conventional in character, — interlaced lines of gold filled in with most varied and delicate colors, the legends which showed their object being incorporated into the general decorative effect. They were among the best things, if not themselves the very best things — for execution — in the room, and a prize could only have been withheld from them for the reason that they were not deemed sufficiently appropriate. We may be sure, however, that neither these nor anything else that was good will be consigned to oblivion. I am told that Mr. Prang has purchased all that are fitted for his purpose, and the public in its next winter's purchasing will have a chance to sustain or to reverse the decisions of the jury. Nor must it be understood from what I have said of the technical and imaginative inefficiency of most of the work called forth by Mr. Prang's munificent offer, that that offer has not been productive of good results. I was viewing the cards from an absolute standpoint, not from the relative standpoint of those from which the public has had to make its choice in former years. Looking over a scrap-book where children's hands have collected the various greetings with which they have been favored for a couple of seasons past, I do not find *one* in which the figure-drawing is really good. Perhaps their acquaintances have been unfortunately unanimous in poor selections, but I do not think so. There are some English cards where roses and other flowers are most exquisitely given, and some, both English and German, where the figure-drawing is just tolerable; but of our native productions not even so much as this can be said. I am sure that we shall all rejoice at the improved display on our stationers' counters next winter, and agree that Mr. Prang has not done unwisely in offering similar prizes for another competition a year from now.

One was satisfied, in conclusion, to notice that there were but few futile attempts to imitate Japanese effects, and, so far as I remember, not one representation of a horse-shoe or a four-leaved-clover!

Among the recent additions to the collection of American pictures always on exhibition at Mr. Moore's, I noticed a small canvas by Mr. Shirlaw, representing a ragged boy and his dog, capitally painted in a roughish style, and remarkable for its vitality and expression. What a contrast to the smooth insipidity, the tasteless "finish," of Mr. J. G. Brown's unnatural ragamuffins! Well worthy of attention were also two large decorative panels by Mr. C. C. Coleman. His brush is sometimes so clever in the rendering of textures — witness the brown glazed pot in one of these pictures — that one cannot help wishing he would turn his attention to compositions that should be true studies of still-life, that should have relief and atmosphere and a natural beauty other than the somewhat affected grace he seeks. He is too clever a painter and possessed of too excellent a taste to keep to this Japanese-y style of work, lovely as it sometimes is in its way, without provoking a protest from all who value him.

Beside Mr. Moran's Turner, we are shown a proof of the owner's etching. It is of large size and shows some marvellously good work. I heard an artist who is also a good critic say recently, that he would not have believed that such work could have been done on this side of the water. It is especially remarkable for its strength, a quality in which our workmen in this line are not apt to excel. But as it stands, the etching is not a very good rendering of the painting. It is only, I am told, a "trial proof after the first biting," and in his subsequent work on the plate the artist will undoubtedly bring the whole into greater harmony, and render with greater accuracy the superb balance and unity of tone which distinguish the original. As it now stands, there is too sharp a gradation between the foreground and the distance of the print.

M. G. van Rensselaer.

HOUSE DRAINAGE.[1] — I.

It remains to consider the proper methods of constructing the private drains leading from each house, and the various fixtures and appliances for receiving the refuse from the house, in a manner which shall serve the convenience of the household and guarantee the speedy removal of all the sewage, without risk of leading into the house any of the gases of decomposing matter which may originate either in the sewers or the drains themselves.

Wherever the water-carriage system is used for removal of excreta, it is very desirable that sewers should also be provided. But as many suburban communities may not yet have provided sewers, and

[1] A lecture by Mr. Edward S. Philbrick, C. E., delivered before the students of the Massachusetts Institute of Technology.

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many good houses are frequently being built in isolated places where sewers cannot be expected to be constructed for a long time, it becomes important to consider the best substitute for sewers in such cases. The ordinary way is to dig a hole in the ground and line it with loose stone or honeycomb brickwork, into which the sewage may be led, and from which it is hoped it may soak away into the soil and be out of sight. Where the soil is very porous and the surface sloping away from the house, this method may succeed for some months and even years without much risk to the house, *provided* this cesspool is far enough from the house to prevent its odors from being carried back through the air, and provided pains be taken that the gases evolved by the decomposition always going on within the cesspool shall not be conducted back into the house through the drain-pipe.

But this method can never be satisfactory. The great risk of all such contrivances is the contamination of the soil and the drinking-water, where this is drawn from wells or cisterns on the same premises. Dr. C. F. Folsom, Secretary of the Massachusetts Board of Health, relates, in the *Medical and Surgical Journal* for March, 1880, that a well which he tested was proved beyond a doubt to be contaminated by a privy vault one hundred feet distant, the well being sixteen feet deep. There was no unusual taste in the water, but suspicion had been directed to it from typhoid fever among those who drank its water. It follows, then, that all porous cesspools must be condemned. They store up the filth in the soil just deep enough below the surface to be out of sight, and out of the reach of the absorbent powers of grass roots, while even when ventilated they do not give access to a sufficient quantity of air in contact with the decaying mass of organic matter to ensure its decomposition. The soil close about them soon becomes saturated with a vile compound, filling its pores by degrees, and finally refusing to carry off even the water, except during the dryest part of the year. Such contamination of the soil in the neighborhood of dwelling-houses is, under all circumstances, to be avoided. Cesspools should therefore be made tight by brick floors and walls, laid in hydraulic cement and plastered with as much care as if they were to act as rain-water cisterns. What then is to be done with their contents when filled? The best way in theory doubtless is to use it for fertilizing the soil. This may be done by pumping and carting where there is not enough land near the house suitable for its absorption. It can be distributed on the land by gravity where there happens to be land low enough, though small house-lots seldom give this opportunity. In accomplishing this where there is land adapted to the purpose, an *intermittent* flow is desirable, both for the sake of flushing the pipes and avoiding deposits within them, and to allow the air an opportunity to follow the sewage as it soaks down into the pores of the soil. The air, thus admitted alternately with the fluids in the finely-divided pores, serves to oxidize a large portion of the organic matter — to burn it up, as it were, and form such new compounds as to favor its more ready appropriation by vegetable life. This intermittent flow has been attained with some degree of success by Field's flush-tank. So far as its flushing power goes, it leaves little to be desired, but it is doubtful whether there is time enough left between its periodic discharges, ordinarily, to allow of much oxidation in the pores of the soil, for this process is a slow one, and must necessarily require a good deal of time where the quantity of sewage is considerable.

Mr. Rogers Field has introduced this process in England, and Col. Geo. E. Waring, Jr., has introduced it in this country and applied it for this purpose with some success. He distributes the sewage from the flush-tank below the surface, in porous drain-pipes with loose joints laid less than twelve inches under the surface. The end sought is to fill the whole system of these pipes with each discharge from the tank, and the sewage is to soak away from the joints of the pipes while the tank is being refilled. In some places this plan has worked well, while in others the joints of the pipe or the pores of the soil, or both, have apparently become choked with the solid particles held in suspension by the sewage, to such a degree that the absorbing power of the soil around the pipes has become impaired. The result is that the sewage bursts up to the surface and becomes a nuisance near the lower end of the system of distributing-pipes. This fault can perhaps be remedied or avoided by a thorough underdraining of the soil and by taking proper pains in laying the drains and providing sufficient surface of land for absorbing a given amount of the sewage. Different localities and different soils give very different results, and it becomes very largely a question of judgment in matters of detail, to adjust the parts of this system so that it will work without further annoyance. It seems to be yet a matter of doubt, however, whether the distributing drains will remain *permanently* porous in any particular case where the quantity of sewage is considerable. The weak point in the system seems to be that certain portions of the pipes and the surrounding soil become so lined with the solid particles of the sewage that the pores are closed by degrees. This capacity for continued absorption will, however, depend very much on the physical character of the soil and the perfection of its underdrainage. The water must of course be given a free path to escape from below the pipes that distribute the sewage, either by selecting a locality with a subsoil that is always dry and loose, or by rendering it so by deep drainage. A perfect uniformity of condition in the porosity of the soil throughout the whole system of distributing-pipes is hardly possible to be attained. It follows that when the less porous places begin to clog, a larger duty is imposed upon the remaining portion, till sometimes the greater part seems to become obstructed. The only remedy is to dig out the pipes and clean them, and the frequency of this operation can only be determined by actual trial.

In all cases where a distribution of sewage is made on the surface or underground, a thorough under-drainage is absolutely necessary. Any locality where this cannot be attained within reasonable limits as to cost is therefore quite unfit for this method.

Distribution of the sewage on the surface, though requiring more attention at stated times than the method just described, is sometimes made use of with success, even on the small scale of one or more houses. I have myself a house occupied for three or four months of the hottest part of the year, where it is managed thus. (See Fig. 5.) A tight cesspool is made in the ground, about one hundred feet from the house, of a capacity sufficient to hold about one week's

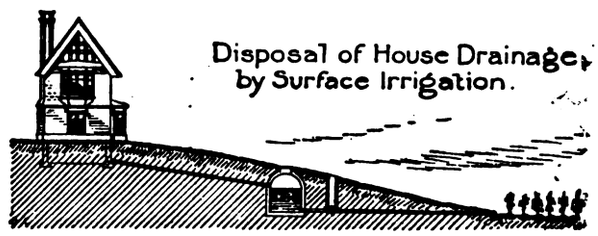

Fig. 5.

accumulation of sewage. When filled, this fact is indicated by an overflow discharging on the surface behind the stable, which pipe also serves as an air-vent. A trench was dug from the bottom of the cesspool, about one hundred and fifty feet long, with its bottom graded so as to drain the cesspool on to the surface of the ground in this distance. A four-inch stone-ware drain-pipe was laid and buried in this trench. Just below the point where this pipe passes through the wall of the cesspool, a common four-inch brass-faced water stop-gate was set in the pipe (C) with a four-inch pipe set upright from its top to the surface of the ground, through which a wrench or gate key can be inserted, to open and close the gate. By opening the gate, the whole contents of the cesspool are by this means discharged at will on the surface at the lower end of this pipe in five to ten minutes. At this point of discharge lies a plot of land used as a kitchen garden. While the sewage is flowing, a man with a hoe guides it here and there between the rows of peas and corn, so as to secure a tolerably uniform irrigation. The soil is light and sandy, and absorbs the whole in half an hour. By choosing for this process a time when the wind blows from the house to the garden, no inconvenience results, and the garden shows the benefits of this application of liquid manure. If this plan were to be used during the whole year, it would require more breadth of land and a greater distance from the house to avoid offence. But under the existing circumstances, where the character of soil and the slope of the surface, and direction of prevailing winds, all combine to favor this method, it has proved very satisfactory, and might be equally so if applied to a combination of houses. If the drain were allowed to discharge continually, directly from the house to the garden, it would flow as a driblet and accumulate a mass of filth at the point of discharge that would become a nuisance. The amount of attention required in this case is trifling, being only about ten minutes once a week, which is well repaid by the benefit to the crops.

The apparatus is all durable, and not likely to get out of repair. Its application without the labor of pumping is of course limited to those places where a sufficient slope of the ground exists to allow the bottom of the cesspool to be drained on to the surface of the ground within a reasonable distance. If no such slope exists, the labor of pumping by hand might be serious, and would, in case of a combination of several houses, justify the erection of a wind-mill or horse-power pump. If the houses were supplied by water under pressure, a larger quantity would probably be used than if it were all pumped, so that the size of the cesspool would either be increased, or the periods of emptying be made more frequent, all of which items must vary considerably with local circumstances and the wants of the families concerned.

Whenever cesspools of any kind are used, especial care must be taken to break the continuity of the drain between them and the house. The most efficient way to accomplish this in a climate where the winters are as severe as with us, is to have a running trap in the drain, of similar section with the drain itself, round and smooth, and to open the drain to the air on the side of the trap towards the house. (See Fig. 6.) As it is desirable to have this trap accessible, it is usually walled around up to the surface with a cover like that of a coal-scuttle at the top. In order to

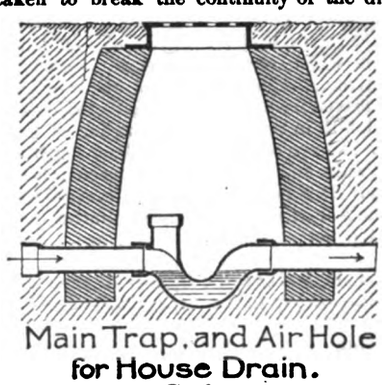

Fig. 6.

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admit the air freely this cover should be perforated with holes. When sewers are provided, some writers on the subject favor the omission of this trap on the main drain, on the ground that it obstructs the continuous flow of the sewage, and that the air of sewers, when properly constructed and ventilated, is not likely to be so bad as that of the house-drains. But I prefer the outside air to either, and do not regard the slight delay of drainage in passing through this one trap, as of much consequence. If it is so constructed as to have no square corners for accumulation of deposits, and if all the drainage of the house flows through it, nothing can stay there long. But this trap should never be applied without the air-hole as described above.

The material generally used for drains outside the house-walls is glazed stone-ware. It is a good material for the purpose when well made. It is furnished in lengths of two and three feet, with special forms for branches and bends. The defects to be avoided in using it are chiefly distorted forms, easily detected by the eye. It should be put together with hydraulic cement, care being taken to keep the joints concentric. Some people recommend hemp gaskets, to be used to hold the adjacent pieces concentric; but unless more length of socket is provided than in the forms now made, there is not much to be gained by using the gasket. Care should be taken to provide a continuous support for the pipe between the sockets by bedding it in cement for the whole length, unless good packing gravel is at hand which can be rammed in on either side. If this is not done, the weight of the filling is likely to break the pipe, particularly the smaller sizes. Care should also be taken to wipe out the surplus cement that is likely to project on the inside. If this is not done, solid rings of cement will be thus formed, that will dam up the sewage and entirely stop the pipe.

In laying pipes that are too small to allow a man's arm to work inside, say nine inches and smaller, this wiping the inside joint must be done with a swab held by a rattan, about a foot longer than the joint of pipe, kept in the last piece laid down and drawn through every joint after the cement is applied. In making connections between drains all rectangular junctions called T-branches should be avoided,

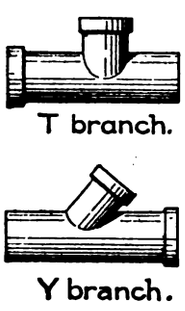

Fig. 7.

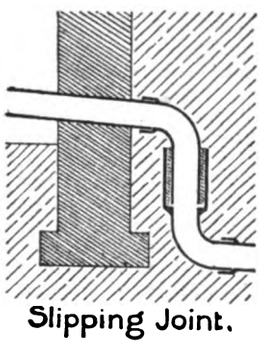

Fig. 8.

except on vertical lines. The joints known as Y-branches are the only ones fit to be used on horizontal lines. (See Fig. 7.) The use of rectangular connections is sure to be followed by deposits, through the eddy caused by the conflict of currents, as explained in the case of sewers.

A most important matter in laying drains is the character of the foundation on which they are laid. If upon filled land, it is liable to settlement, and since the stone-ware pipe, jointed with cement, is perfectly rigid, the least settlement breaks it somewhere, and leakage occurs. The buildings generally rest upon piles in such places, and the drain being therefore on a rigid foundation where it leaves the house-wall, is sheared off near this point by the settling of the material outside the wall in which it rests. The substitution of iron pipe for the stone-ware between the house and sewer does not remedy the trouble, for even iron would be broken under such circumstances. Where there is a foot or two of fall to be spared, the trouble may be remedied by making a step downward in the drain just outside the house-walls (See Fig. 8), making a vertical joint with a long lap and packing it with elastic cement; but this extra fall can hardly be provided in Boston upon the filled lands, without getting below tide-water, at least not until the new system of drainage shall come into use, through the intercepting-sewer now in progress. The weak point being just outside of the house-walls, can generally be made accessible in the same man-hole which serves for access to the main trap and air-hole; so that breakage can be detected and repaired without great cost, and, if inspected frequently, without incurring the risk of saturating the soil with filth in contact with the cellar walls as is often done by such leakage. I have seen it in some cases penetrating through stone foundation walls and up through concreted floors from the saturated soil outside. It is next to impossible to shut such filth out of the cellars after the soil once becomes thus polluted, for it is both fluid and gaseous, and penetrates the minutest pores. Even where the soil is firm, drains are often found to be broken just outside the cellar walls if they are laid above the bottom of the cellar excavation, as is sometimes done, owing to the loose condition of the soil that is filled under them at this point, where recently excavated. This can be corrected by puddling the filled material under the drain by water, and waiting a week or two after such puddling before laying the drain. It should be remembered that drains when once laid and buried are out of sight and out of mind. A slight defect through poor workmanship can only be detected after some months, perhaps years, during which time the soil may have got polluted to an incurable degree. It therefore becomes of the first importance to see that the drains are laid in a permanent and workmanlike manner at first, otherwise the pollution may go on till the house is rendered untenable which would otherwise have been healthful.

The size and inclination of house-drains are important matters, to be settled by proper principles. Where but little rain-water is to be provided for, a four-inch pipe is large enough for any ordinary house drain whether outside or inside the walls. But it is generally desirable to take into the drain the rain-water from at least one half the house roof, for the sake of flushing the outside trap. Moreover, the stone-ware pipe when as small as four inches in diameter is too imperfect in shape to make a continuous smooth conduit, without slight offsets at the joints that interfere with the flow. So it is generally conceded that private houses should have at least six-inch drains when made of stone-ware and receiving some rain-water from the roof. This size is large enough for the sewage of a household of fifty persons or more, unless the rain-fall from more extended roof-surfaces is to be provided for. In this case the size of the drain is to be governed, first by its inclination, which is generally limited by local topography, and second, by the size of the roof to be drained. In our climate, a rainfall of one inch and a half per hour from the roof-surface should be provided for, adjusting the size of the drain to carry this rainfall. In such cases the sewage can be practically ignored, for its volume is insignificant in comparison with the rain-water. The problem becomes then a question in hydraulics, and reference must be had to the governing elements and well-known physical laws, from which we compute the required size. In order to make drains self-cleansing, their contents should have a velocity of at least two and a half or three feet per second. To attain this in a six-inch pipe a slope of one and one half per cent is required, when the drain is running half full, and it seldom is filled above that point. If this rate of slope cannot be attained, some provision must be made for frequent flushing to avoid deposits, for it must not be forgotten that the cardinal rule in drainage is to *keep everything moving*, and allow no sediment to remain in the pipes. Drains are often made of unnecessary size. This is a more serious defect than would at first appear, for increase of size beyond what is required for carrying capacity is an actual injury, by diminishing the scouring power of the current. It cannot be expected that the interior of our drains and sewers should be so clean as to be entirely free of the gases of decomposing matter, but it is very desirable to reduce their volume to a minimum, and then apply all possible precautions to prevent their mixing with the air we breathe.

The large increase of the quantity of water used in our houses at the present day, compared with that used by former generations, is justly regarded as a most valuable agent for raising the standard of cleanliness among the poor and for contributing to the comfort and luxury of the wealthier classes. But it must not be forgotten that the use of water in this way brings with it an increase of risk if not properly got rid of. The more water we use to dilute our sewage, the further it will penetrate through the pores of the soil, unless securely led off in proper channels, to proper places.

THE ILLUSTRATIONS.

ST. MARY'S CATHEDRAL, TRURO, ENGLAND. MR. JOHN L. PEARSON, A. R. A., ARCHITECT.

For a description of this building, see the letter of our London correspondent.

DOME OF THE HARTFORD CAPITOL. MR. R. M. UPJOHN, ARCHITECT, NEW YORK, N. Y.

DELTA PSI CHAPTER-HOUSE, NEW YORK, N. Y. MR. JAMES RENWICK, ARCHITECT, NEW YORK, N. Y.

CORRESPONDENCE.

ARCHITECTURE AT THE ROYAL ACADEMY.

London, May 17, 1880.

The drawings and designs this year show a fair average of merit, and one is glad to see the general tendency is towards quiet good work, rather than to the fussy architecture of some former years. Though with the exception of one building — which we shall presently mention — there are no very striking designs, still, on the other hand, there are few utterly bad ones; the restlessness which it was to be feared might result from some recent work is toned down, and the outlook generally is typical of an advance in architecture as a fine art.

The exception just mentioned is Mr. Pearson's Truro Cathedral, a design so noble in itself, so worthy its author and the occasion which has called it forth, that as far as the architectural gallery is concerned the exhibition of 1880 may be remembered as the Truro Cathedral year; indeed, taken simply as a work of art, there is nothing to surpass it, either among the paintings or sculpture, and it goes to prove what has been asserted before now, that even with their sadly diminished numbers, the architectural R. A.'s and Associates are among the strongest members, artistically speaking, in the Academy. As such a design as this deserves more than a merely passing notice, we propose to give a few details concerning its features. It will be remembered that Mr. Pearson was chosen from among a selected list

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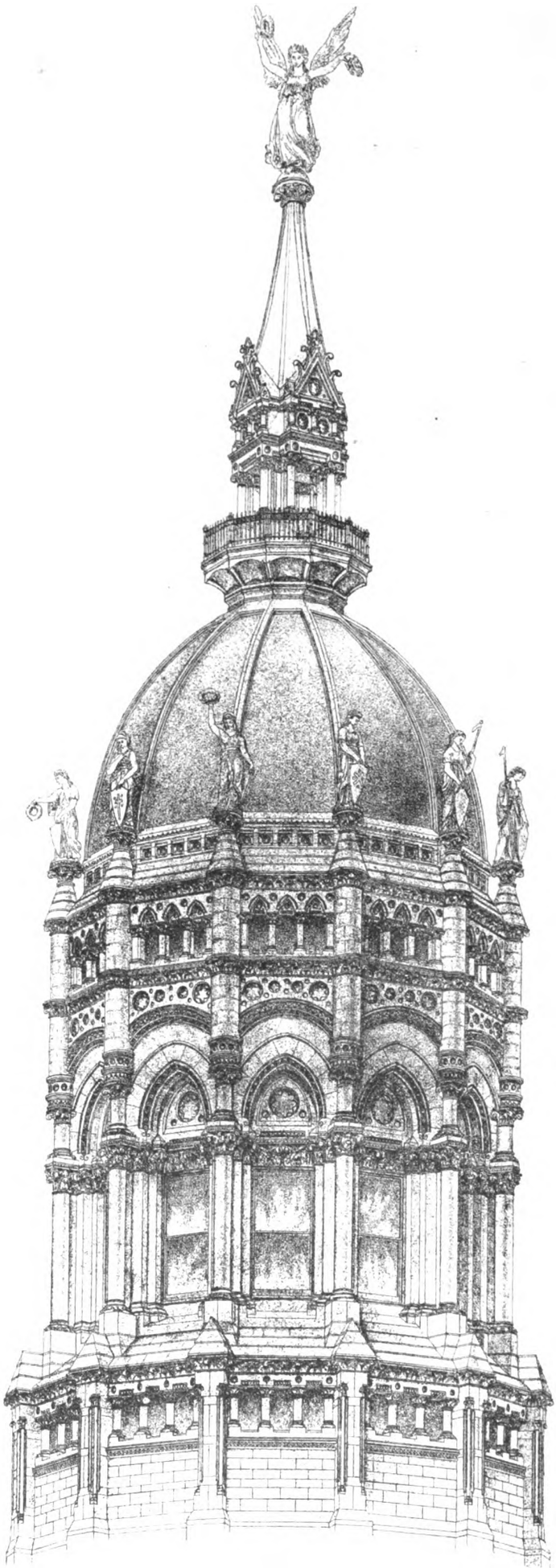

DOME OF HARTFORD CAPITOL. RICHARDSON ARCHT.

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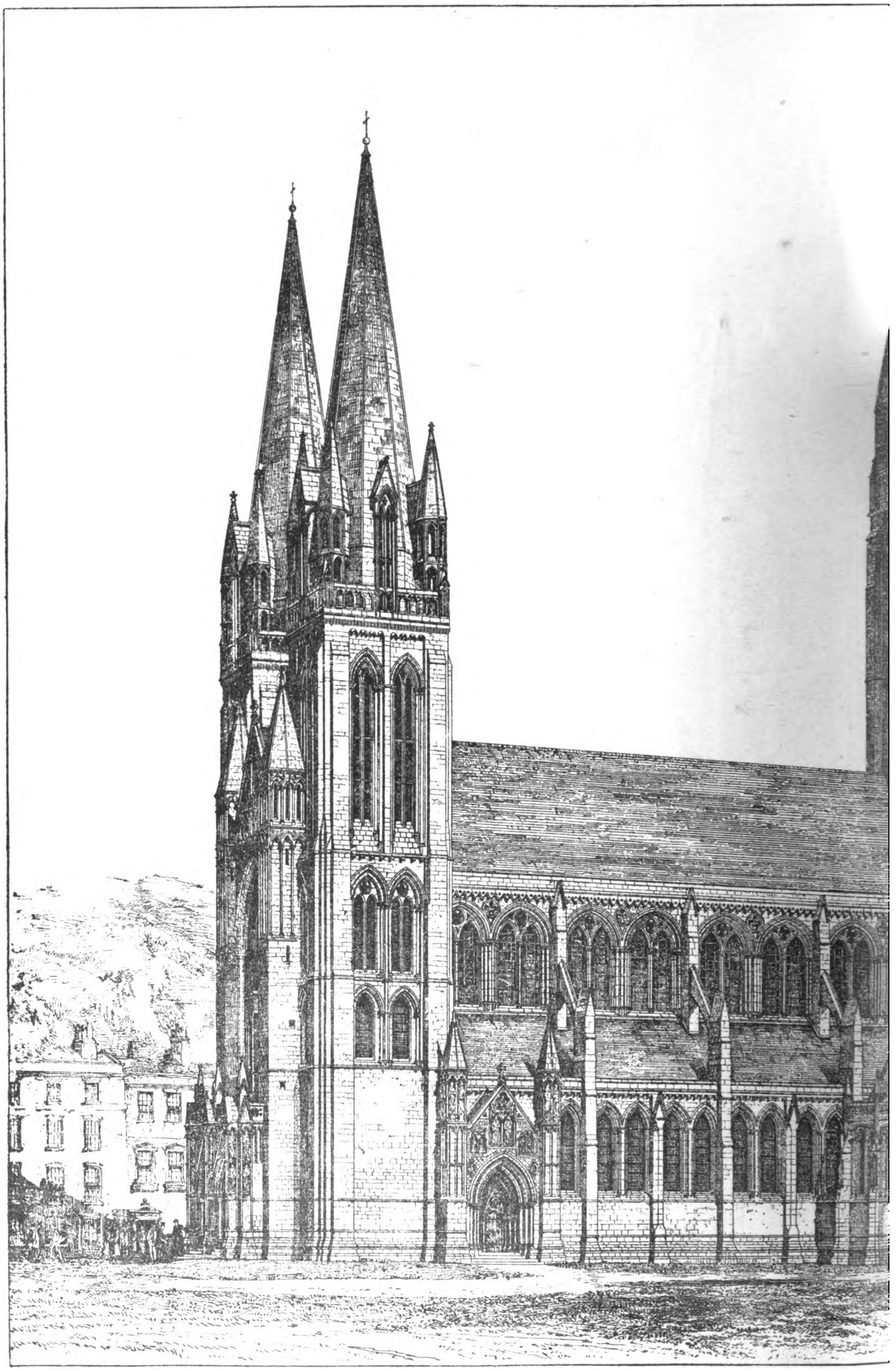

TRURO CATH
J. L. PEARSO

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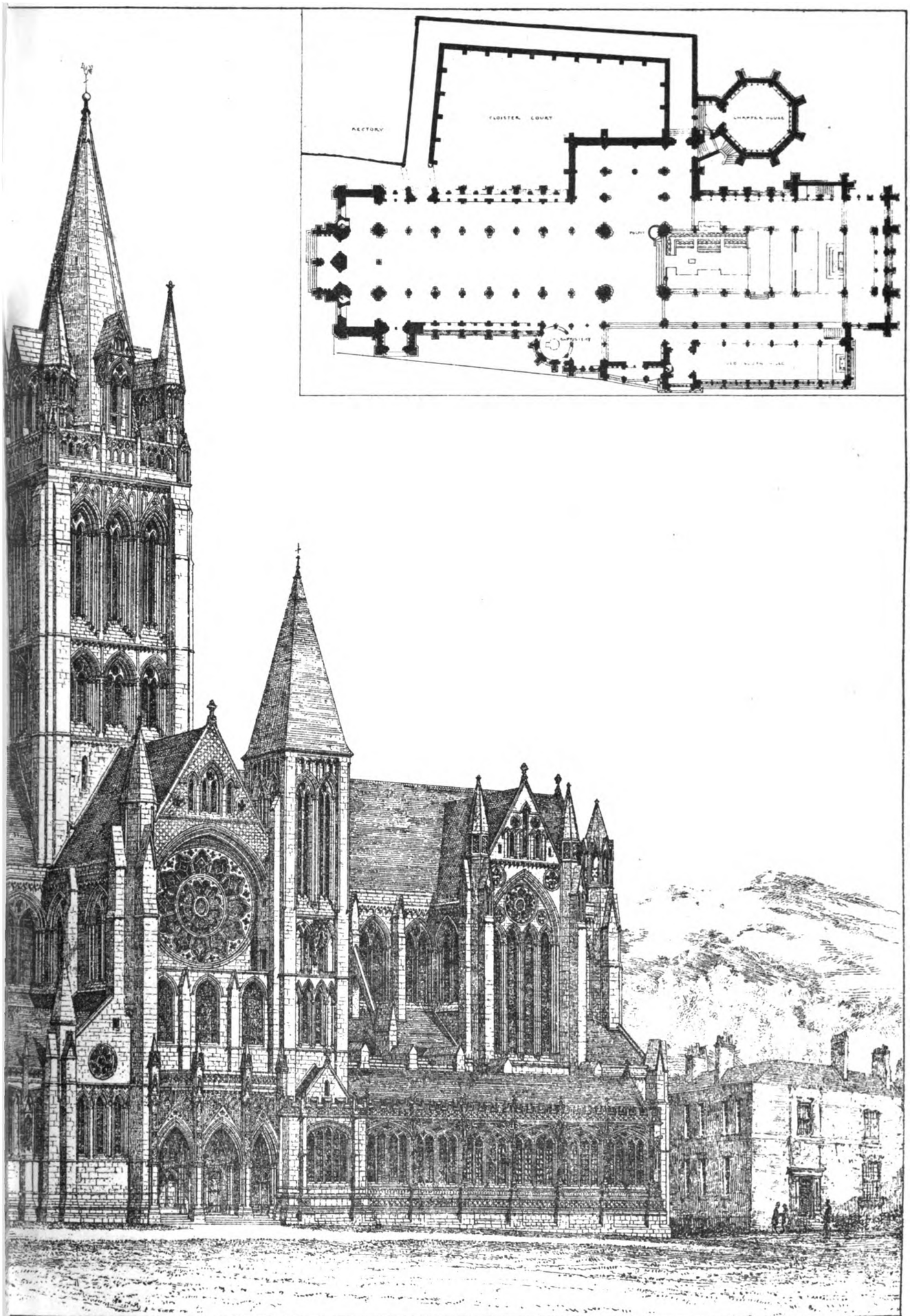

EDRAL, S. W. VIEW.
N, A.R.A. ARCHITECT.

THE HELIOTYPE PRINTING CO. BOSTON

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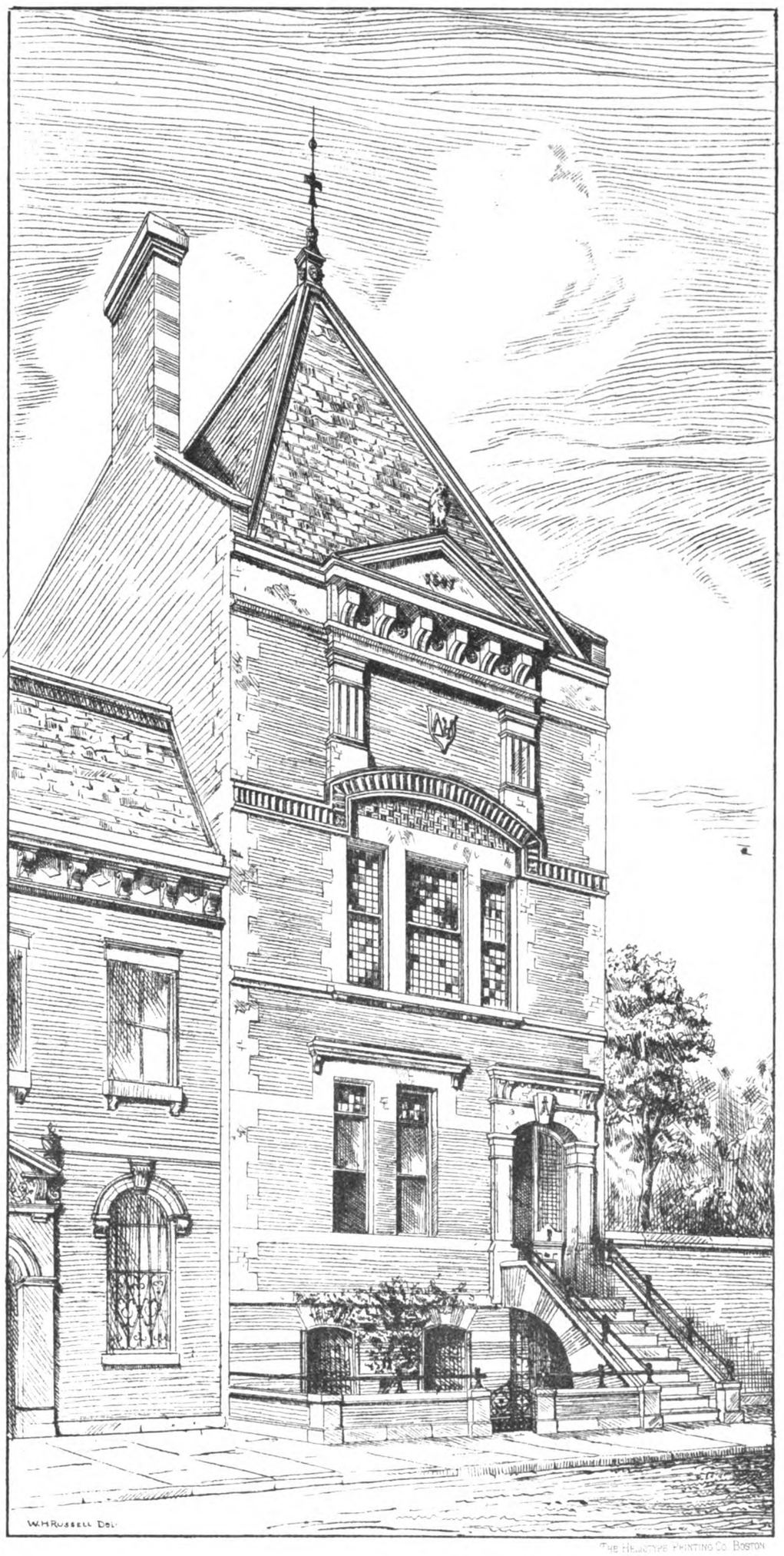

Delta Psi Chapter House New York City · J. Renwick Archt.

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of architects, chiefly, it was understood, on the strength of his recently completed churches of St. Augustine's, and St. John's, Red Lion Square; and Truro Cathedral may be fairly said to be the legitimate successor of these fine works. Designed in the same style of thirteenth-century Gothic, it is marked by the same thought in planning, the same elegance of proportion, and the same refinement and delicacy of detail. Owing to the purchase of additional property on the north, Mr. Pearson has had the advantage of a larger area to work upon than was at first contemplated. The plan reminds us of Wells in its general proportions and arrangements; indeed, exclusive of the Presbytery and the Lady Chapel of the latter, the two are not far from the same size. The new cathedral is to consist of a nave and aisles, with two west towers, choir with aisles, transepts, with central tower at the crossing, a chapter-house and cloister-court on the north, a baptistery on the south worked into the angle of the nave and transept, while the south aisle of the old church of St. Mary, a structure of the fifteenth century, is retained on the south of the choir, as a chapel for morning services. There is also a crypt under the choir which will be used for vestries, etc. In length it is about 280 feet inside by 65 feet across the nave and aisles, and about 115 feet across the transepts. A clock-tower stands at the junction of the old aisle and the south transept, and the choir is enriched with additional transepts towards the east end. These features add much dignity to the grouping externally, and together with the great central and western towers, give a most cathedral aspect to the whole composition. One of the most noteworthy points in the plan is the admirable manner in which the old aisle of St. Mary's is worked into the choir; indeed, it seems to have given the key-note to the scale on which the whole work is set out. The charming baptistery with its circular end reminds us of the morning chapel of St. John's, while the double aisle walls (the inner one being arcaded) is a favorite arrangement with Mr. Pearson, and his fondness for galleries crops out at the west end of the nave, and the end of the north transept.

The entrances to the church are by a grand double doorway in the west end of the nave, a south porch, and a triple portal leading into the south transept, additional doorways lead also to the closters, and to the chapter-house. The general character of the windows is lancet lights; the gables of the nave and transepts are filled with large rose windows, the east end, and transepts of choir, with groups of tall lancet lights. The cathedral is vaulted throughout, and the central tower is open internally, forming a large square lantern, with an open-work gallery all round above the arches of the crossing. All this is most admirably designed, even for such a master of vaulting as Mr. Pearson has shown himself to be; the contrast, for instance, between the vaulting of the nave and choir is most effective, and the result of the whole will be a most noble and impressive interior. Externally, also, as has been said, the proportions and grouping of the several parts is very fine indeed, and it seems almost invidious to find fault. Nevertheless, we take exception to the treatment of the clock-tower, as seen in the southeast view: its roof is commonplace, and the belfry stage lanky in the extreme; it does not seem in harmony with the rest of the work. The central tower is very noble indeed, though the spire might be a trifle higher. On the other hand, the spires of the western towers seem to err on the side of height, as do also their belfry stages; but the simple unbroken buttresses rising from the ground, and the grouping of the pinnacles at the junction of the towers and spires, are beyond criticism. Taking it all through, it is probably the finest church designed since the Gothic revival, and when finished promises to be in every way worthy to rank with its older compeers.

We may add that the Prince of Wales, as Duke of Cornwall, laid the foundation-stone on the 20th ult., and that it is proposed to proceed with the choir and eastern portion first, at a cost of about £35,000. From £60,000 to £70,000 will be required for the rest of the work, so that £100,000 may be set down as the probable cost of the work complete. It is proposed to use Cornish stone for the walls, and cover the roof with red tiles, but these and other matters are still under consideration.

The building is shown in the Academy in four drawings, — which, by the way, might just as well have been hung together, — viz., elevations of the west and south fronts, a longitudinal section looking south, with a small scale plan, and a perspective view from the southeast.

Mr. Pearson also sends two views of Westwood House, Sydenham (Nos. 1120–1130), a charming residence in the style of François I., showing that he knows something of Renaissance as well as Gothic. But having noticed the great work of the year, we will proceed to notice the more important contributions, taking them as they come in the catalogue.

No. 1086. The Council Chamber, Wakefield Town-Hall, by Mr. T. E. Collcutt, is a good interior in free classic, with panelled walls and ornamental ceiling; the weak point seems to be the chimney-piece, which is lumpy and meaningless in design. 1087. Congregational Church, Bromley, by Mr. Jno. Sulman. A view of the west end, the gable of which is very picturesque, and cleverly managed, except the stair to the gallery, which looks very awkward indeed; style, early Gothic, like most of Mr. Sulman's churches. 1088. Grand Saloon, Kenhill, by Mr. J. J. Stevenson. Another interior, with very heavy beams to the ceiling, and very thin furniture — not at all up to what we should expect from its author, after all his study of such subjects. 1090. St. Oswald's College, Ellesmere, Shropshire, by Messrs. R. H. Carpenter and Ingelow. A very collegiate-looking piece of work, of very English character. 1089. Another college, this time by Messrs. Dunn and Hanson, but not so good as the other, except the chapel. 1091. Garden front of a Surrey house, by G. E. Street, R. A. A most charming bit of half-timbered work, except the summer-house, the balcony of which looks exactly like one of Mr. Street's pulpits, the impression being heightened by the figure in it with outstretched hands as if preaching, — a most unhappy effect. 1100. House at Aigburth, by Mr. J. M. Brydon. A picturesque looking country house, with half-timbered gables, broad mullioned windows, and tall chimney-shafts. 1103. West London School of Art, by Mr. R. W. Edis. A most sensibly treated piece of work, showing a most effective street-front in brickwork, evidently thoroughly well adapted to its purpose. 1106. Boat-house and barge for the Oxford University Boat Club. A charming piece of Old English work, the upper part half-timbered. The barge looks like an old galley of the time of Queen Anne. Designed by Mr. J. O. Scott, and shown in a couple of very effective drawings. 1107. St. Joseph's Catholic Church, Guildford, by Mr. E. Ingress Bell. A very clever little church, in the Early English style, very well drawn and thoroughly good in feeling, both in plan and elevation, particularly the east end. 1108. No. 70 Marine Parade, Brighton, by Mr. R. W. Edis. A picturesque looking seaside house, with plenty of balconies to lounge about on — interesting design in many respects. 1110. Interior of the Church of St. Michael, Camden Town, by Messrs. Bodley and Garner. A very fine interior of a noble town church in sixteenth-century Gothic, very well detailed, as all Mr. Bodley's work is, but the simple barrel roof looks plain almost to bareness, unless it is intended to be decorated, which most likely it is. 1113. "Memorial to be erected at Chiselhurst to the late Prince Imperial," by Mr. E. R. Robson. This is simply a copy of a Runic cross, and might be a monument to anybody, for anything it has to do with the poor ill-fated Prince Imperial. 1117. "A House about to be built," by Mr. J. E. Collcutt. A most picturesque looking residence of a Queen Anne type — shown in a very clever drawing — slightly inclined to be eccentric, perhaps, but very good in detail and general design. 1119. Premises at the corner of Bond Street and Piccadilly, now building by Mr. Alfred Waterhouse, A. R. A. A rather commonplace looking building, in brick and terra-cotta, in Mr. Waterhouse's favorite phase of Gothic — not by any means equal to some of his other works, and so possessing less interest than is usual in his designs. The terra-cotta business seems getting overdone, if this is to be taken as a sample.

1125. Clumber House, Notts, by Charles Barry. A large drawing showing the restoration of this important classic house, with small sketches of its appearance after the disastrous fire which laid it in ruins some time ago. The type of classic of the old house has been retained, but the whole composition seems uninteresting the additions seem large and important, though the plans are on too small a scale to afford much opportunity for studying the arrangement; doubtless they are all that can be desired for comfort and convenience, but somehow, artistically speaking, the result is not very satisfactory, and it does not strike us as what a grand classic mansion should be, or that the most has been made of such a splendid opportunity. Very different is the "House at Sunninghill," by Mr. R. Norman Shaw, R. A., shown in two drawings (Nos. 1126 and 1127). One is the entrance front, and the other the garden front. The mansion is in the old English half-timbered style its architect knows so well how to use. The entrance front is perhaps plain to a fault, but that towards the garden is most charming — full of quiet picturesqueness and homely feeling — all the more welcome that some of Mr. Shaw's Queen Anne efforts of late have not been quite what one expects from an artist of his powers. But here at Sunninghill he is in his old element, and successful accordingly; the arrangement, too, of the plan is exceedingly interesting, and the rooms must be very pleasant to live in. This is Mr. Shaw's only contribution, and is so good that we wish for more from the same clever pencil.

Ere concluding the present notice, we must not overlook No. 1122. Proposed new belfry and ringer's loft to the tower of St. Lawrence's Church, Ipswich. A very clever design in late Gothic, by Mr. Howard Gage. It looks quite like old work, and we hope it will presently become something more than proposed, as it certainly deserves to be erected forthwith: so quiet a piece of work, and so English in feeling, is a relief after some of its more restless neighbors on the Academy walls.

ST. MARKS, VENICE.

THE following letter has been received from Mr. Street, R.A., by the Secretary of the Society for the Protection of Ancient Buildings: —

SUBIACO, March 19.

My dear Sir, — I have recently been able to examine the work executed in this church during the last few years, and at the same time to form an idea from what has already been commenced of what it has been proposed to do on the western façade of the church. It was nearly three years since I had been at Venice, but I am sorry to say that in every particular I find that the statements I made at the Oxford meeting were exact and perfectly justified. As to the state of the fabric, Mr. Stevenson's letter to you of December 18, 1879, was entirely confirmatory of my opinion, and I cannot find a word in Signor Meduna's letter to the *Building News* which contradicts or in any way opposes Mr. Stevenson's statements as to the state of this part of the structure. But as to the future, Signor Meduna complains that "it was asserted by Mr. Street that the

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western façade was in a good state of construction, and that the alterations proposed would be detrimental to art." This, he says, is "an erroneous opinion," for that "the propositions which have been made tend in the direction of reparation and nothing more." To "reparation and nothing more," where it is absolutely required, I should be the last to object, and it was because I thought I saw evidences of a design to reconstruct and improve the west front after the manner which has most undoubtedly been pursued in the northern and southern façades that I spoke as I did. Now that I have again seen St. Mark's free from scaffolding, I am utterly unable to harmonize what every one can see already commenced with the "reparation and nothing more" of which Signor Meduna speaks. Nothing can be more exact, more neat and accurate in workmanship, or more true and level in all its lines than the new work recently executed on the southern façade. Few buildings ever erected were built with less regard to any of these modern ideas of what is excellent, and the consequence is that it is impossible to join such new work and such old work without an evident break in the system at the point of junction. Neither on plan nor in elevation does the new work already executed on the western front for a few feet in length from the south-west angle agree with the old plan or the old elevation. This is specially to be noticed in the plan. The whole façade has at its base a marble seat or step. In its former state this was continuous throughout. Signor Meduna's seat or base is already built for several feet, and at the point at which its stops it is 12 centimetres higher than the old step on which it abuts, and 15 centimetres in advance westward of it. It is difficult to conceive how this new work can have been executed by any one who only contemplated repair. What was evidently intended was to make the base straight on plan and level from the south-west to the north-west angle of the front. No other explanation of the work already executed for several feet on the western front is possible. Nor is there any way of getting over the difficulty which has been created, save the taking down of a good deal of the new work. The continuation of the work already done would actually involve the entire destruction of the whole west front! As to the ground plan of this front it is most important to observe that it was originally built and planned on a curved line, the centre being recessed about 25 centimetres from a line drawn from angle to angle. Mr. Ruskin many years ago drew attention to the way in which all the apparently corresponding dimensions of the archways and piers in this façade were varied with, as he said, "a true artistic instinct." I do not recollect whether he noticed the curvature of the plan. I had never before done so. But on trying to make out why Signor Meduna could have made his base project 15 centimetres in front of the old base, I became aware of the fact. The line adopted by him was intended to be carried in a straight line from the south-west angle to the north-west angle. In not one inch of its whole extent would it have stood where the old base ever stood, and in the centre it would have been 33 centimetres (1 foot 1 inch) in advance westward of the old work. If, however, this step, seat, or base is brought forward, it must be assumed that the whole of the rest of the work must be brought forward also. This, of course, means that the west front must be rebuilt in the same way as the north and south fronts, with the same hard straight lines everywhere. I turn now to what has been proposed as to the elevation. Here the base or plinth as far as the jamb of the first archway of the front has been built 12 centimetres above its old level, and the first columns of the front are placed so much higher than they used to be. The capitals of the new columns are about three inches higher than the old, the capitals of the second order of columns are about level with the old, while finally the parapet at the top is 15 centimetres (6 inches) higher than the old. If the intention was not to rebuild the whole front according to the corrected and exact dimensions of the new work, I can only say that one of the most strange blunders of which I ever heard has been perpetrated. Assuming that it was necessary to rebuild the south front, it would have been most easy to accommodate the new work to the old, both in plan and elevation; whereas now the columns with their bases and caps of the southern archway must all be taken down and rebuilt at a new level, then the next arch will be declared to be out of the level, and so on all along the front. In the same way the arcaded parapet already built must be taken down again, or the whole of the old balustrade or parapet will have to be rebuilt on the new level. It seems to me, I must say, to be less damaging to Signor Meduna as an engineer to assume that it was his intention to rebuild the whole front, than to suppose that he went on year by year with the work of renewing the southern façade and south-west angle without observing that he was getting both his plan and his levels different from those of the old work which he had to effect a junction with. I venture to say, therefore, that when we told the meeting at Oxford that the "total destruction and rebuilding of the west front" was proposed, so far from being as Signor Meduna says, "inexact" ("nothing can be more inexact" are his words), we were saying that which was the only possible conclusion from an examination of his own executed work.

Another point on which I spoke at the Oxford meeting also requires a few words from me. This is the renewal of the ancient mosaics of the baptistery. At the Oxford meeting I was able to exhibit several fragments of the old mosaics. These had been to a large extent taken down from the roof, and were lying in a heap in a chamber over the west front. This heap was seen by two of my informants. When at Venice I asked to have the door opened, and my request was refused. The old mosaic is, no doubt, still there in a confused heap, though the restoration of it is nearly complete. Now, this restoration has undoubtedly, like all the work, been most carefully done. But the result is unfortunate. The new work is done, according to the fashion of the day, on paper and in a shop; its surface is, therefore, much neater and smoother than that of the old mosaic. Some of the old mosaic still remains; and as it does not agree in effect with the new portions, the white plaster joints are got rid of in favor of colored joints, and so the tone of the old work is brought up to something very like that of the new. So also in the merely decorative work the new is much harder and more exact in drawing than the old. I need hardly say that where so nearly complete a renewal of a mosaic has taken place, what is now left has no archæological value whatever, and can only be regarded as a piece of new decoration founded upon an old design.

I am bound to say that I came away from Venice entirely in despair about St. Mark's. It is a building in which no single axiom of the perfect nineteenth-century workman was ever regarded by the old builders and decorators with an atom of respect. The men who built it drew everything by hand, set out everything by eye, and seem to have had an instinctive delight in curved and rounded and irregular surfaces and outlines everywhere.

The nineteenth-century workman does not care much about the quality of his mortar, his marble or his bricks, but he does care intensely to have every angle perfectly square, every dimension exact, and every line straight. If you add nineteenth-century work and modes of work to such a building, you come of necessity at last to a fatal dilemma. Signor Meduna has done this to demonstration, and the only cure for what he has done is to take some of it down again (at least, as far as the south-west angle) so as to make it possible to repair the south-western arch of the west front exactly on its old lines and levels. The rest of the front can then be left alone. If this course is not pursued, there is, I fear, no doubt but that bit by bit the anticipations which were indulged in at the Oxford meeting will be realized, and the plea will be that the lines of the façade were curved and irregular, and the dimensions of the arches and the piers unequal, and that all this inexactness requires cure and amendment.

Your society will, I am sure, hear with more than interest that the Ducal Palace is also being cleaned and restored. The weather stains are being cleaned from the exquisite capitals, and much new work is being done, but as I was unable to penetrate behind the hoarding which conceals a great part of it at present, I am unable to do more than state the fact. I remain yours very faithfully,

George Edmund Street.

THE DRIVEN WELL.

Few people familiar with the tube or driven well appreciate the fact that there is any essential difference between it and what is known as the dug well. The tube well is generally supposed to be a very narrow well, which works in the ordinary manner, the only point of difference being that of diameter. Colonel Green's discovery is, therefore, generally supposed to be simply one of making a very narrow well do the work of a wide one. Had this been the nature of the invention, or had there been no other element than this introduced, no patent would have been granted, and the first experiment with a tube well would probably never have been repeated. We find that people do not really understand the nature of the invention, nor how it happens that a tube well can be put down and give a continuous supply of water, when an ordinary well in the same spot would be dry or the supply intermittent. In the ordinary well we make a subterranean reservoir below the level at which the water stands in the soil, or we tap an underground spring, which partly fills the reservoir, and from this supply we draw our water. To fill the reservoir we depend entirely upon the action of gravity. Frequently, in cases of severe drought, the capillary attraction of the soil is great enough to prevent the diminished quantity of water falling by gravity, just as a sponge which has been thoroughly wet ceases to drip after a time, and holds the remaining water in suspension against the force of gravity. The tube well acts upon an altogether different principle, since the construction is such that gravity is not depended upon to force the water to the bottom of the well. The pump tube is driven through the earth, forming an air-tight cylinder reaching the water-bearing stratum, and upon working the pump a vacuum is formed in the tube, into which the atmosphere forces the water from the lowest stratum reached. This is the essential difference between the tube well and the dug well. In the one case gravity alone carries the water to the well, while in the other the atmospheric pressure of fifteen pounds per inch on the surface of the earth forces the water within it to rise in the tube when a vacuum is formed. It is essential, therefore, that the top of the tube or driven well should be tightly closed, in order that the water may be forced out of the soil. This difference of action explains why it is that the driven well is so frequently successful where it is almost impossible to obtain water from an ordinary well.

Two small pumps were set in a large box of sand, the tubes of each pump extending about thirty or thirty-six inches into the sand. In one case, the pump was surrounded with an open-topped case of perforated brass, some six inches in diameter. In the other, the tube was driven into the sand, as is usual in driven wells. The pumps and their attachments were miniatures of those commonly used for driven wells. Both pumps returned the water to the sand in the box, none being wasted. Water was poured into the sand, and, after a time, stood in the well above the top of the strainer upon the pump

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tube. When the pumps were worked, it took but a short time to pump the well dry. On the other hand, the second pump could be worked continuously, the atmospheric pressure forcing a continuous supply to the pump. The well was then filled with sand and tightly packed, making what was equivalent to a driven well inside the perforated brass casing. When this was done, its pump could be worked and furnish a continuous supply, as in the second case. Another experiment was very conclusive. It employed an ordinary wide-mouthed jar and a small pump. Around the bottom of the jar a number of holes about one-sixteenth of an inch in diameter were made. There were twelve, if we remember rightly. The top of the jar was closed by a tight plate having an opening for a stopper in it. This jar was placed in a small square vessel of water which rose to the same level inside as outside the jar. If the plug in the top was left out and the pump worked, the water was rapidly reduced, not being able by force of gravity to flow into the jar as rapidly as it was removed by the pump, thus giving a fair illustration of what happens with an ordinary well in dry times. When the plug was inserted into the cover, the apparatus represented a driven well, and it was found that the air forced the water into the jar as fast as the pump could remove it; consequently there was a continuous supply. It often happens that upon stopping the pump the water stands higher in the jar than outside, owing to some of the air having been carried out by the water. These experiments demonstrate most conclusively that the driven or tube well differs from the ordinary well, not only in construction, but in its method of action. The differences, it will be seen, are radical and of the most important character. The tube well is not only cheaper, but it is more efficient than the dug or open well, and its capacity for delivering water is limited only by the amount in the soil, which is always more than can be exhausted by pumping. — *The Metal Worker.*

THE LARGEST CONCRETE TANK IN ENGLAND.

THE students of the Institution of Civil Engineers lately visited the South Metropolitan Gas-works, adjoining the Surrey Canal, Old Kent-road, S. E. They were received by Mr. George Livesey, M. I. C. E., the engineer and secretary, who explained that the works contained few new features, except a series of large gas-tanks and holders, in which the company was trying to solve the problem of erecting, at a reasonable outlay, capacious gasometers that should be water and gas tight, on a low, marshy site, of very unfavorable character for securing stability of foundation. The gasometers stand in line on the company's works in the order of time at which they were erected, as well as in size. The chief improvement has been in the construction of the tank. The soil of the company's works, after a few feet of loam and a layer of gravel, is a fine running green sand, shifting in position, if wet, at every disturbance of the bed; at the depth of about forty-five feet, this is succeeded by a six-inch layer of flints, and that again by chalk deposits of unknown thickness, pierced by numerous springs. The difficulty encountered was that as each fresh excavation for a tank was made, the sand "ran" or "blowed," endangering those already built, and in some cases occasioning troublesome cracks and leaks, which had to be remedied. The first tank of the series was constructed in 1866, and is 127 feet six inches internal diameter, and is embedded thirty-five feet six inches below the surface. It was built in brickwork, surrounded by clay puddling to the ground-level, in order to render the sides impervious, and in the centre a cone of puddle was erected as a support to the roof of gas-holder. The next tank, formed in 1871–2, was 152 feet six inches diameter, and thirty-eight feet six inches deep. It was of "composite" character, of brick and concrete. The excavation was lined with nine-inch brickwork, with a fourteen-inch course of bricks at every two feet to serve as a keying for the concrete backing, varying from forty-two inches at bottom to eighteen inches. Hoop-iron was introduced as bond about every five feet. At the foot was a course of stone, which was also used for piers and for the centre of central cone, and, as before, clay puddle was filled in as a backing. The third tank, built in 1875–6, was 184 feet diameter by forty-seven feet deep, and in this the puddling and brickwork was replaced by concrete and cement rendering. The outer gas-holder was 180 feet across by forty-five feet, and the inner one 177 feet by forty-five feet three inches, and this had a roof of iron supported on timber-work and iron struts resting on a brick cone. This tank stood perfectly for a time, but, after being filled, five small cracks developed, and were now being repaired. The brickwork skin to the earlier tanks was adopted to save trouble in giving a true face to the work; but Mr. Livesey said he was satisfied it was needless as well as costly, and the present tank, like the last, is being constructed entirely in concrete, and when completed will be the largest of its kind. The dimensions as now being executed are 218 feet diameter and fifty-five feet six inches depth. The contractors for this tank are Messrs. T. Docwra and Son, of Balls'-pond, N., who also built the previous tanks, and their contract, taken at £26,500, will be completed in about a month's time, and has now been in progress for twelve months, from Mr. Livesey's designs and under his superintendence. In excavating, great difficulties were occasioned by the influx of water, not alone from the sub-soil, but also from springs in the chalk; and a "sump" has been formed to which the water is drawn from under the tank, and is pumped at the average rate of 1,800 gallons per minute into the sewers. The drainage-holes in the tank are rendered round in cement, and will be calked up when the work is complete. Three hundred navvies, fourteen engines of from six to twenty-five horse-power, three locomotives, and six steam-cranes are employed on the works, besides two steam-pumps. Three eighteen-inch, and three fifteen-and-one-half-inch pumps are at work, capable of throwing three thousand gallons per minute, and at the lowest excavations they were in full use. Only one horse has been in use during the work. The concrete used is composed of seven parts of ballast, mixed with broken retorts and clinkers from the gas-works, to one of Portland cement. The walls vary in thickness from three feet at surface to five feet, the lowest portion being only four feet six inches thick. At intervals of every three or four feet, this is strengthened by iron bands, three and one-half inches wide, by one-half inch thick, set edgeways in double row, and the face is rendered to a true surface in three-fourths inch pure cement. This wall has been built by the ordinary boarding by day-labor, no special apparatus being employed. The concrete is mixed in the tank, care being taken by cleaning off the surface before laying another course to secure homogeneity in the work. This wall is backed up by the green sand found *in situ*, which, when kept dry, forms a solid and water-tight packing. The great central cone for the support of the roof, the cylinder upon it, twenty feet high and two feet thick, and the base platform between the tank wall and this cone, are also of concrete, no puddle, brick, or stone, being introduced, even for the heaviest work. Mr. Robinson mentioned that 13,000 fourteen-foot deals, as timbers, and 3,000 struts, of an average length of fifteen feet, had been used in support of the concrete walling. This work, as we have before intimated, is approaching completion, the cement-rendering being in progress over a great portion of the wall. The holder to be placed within and upon this concrete substructure will be in three lifts, rising when full to a height of nearly 160 feet above the surrounding streets. The holder of 1872 at these works was constructed of one-eighth inch plates with occasional ribs of $\frac{1}{4}$ inch metal; the extra thickness, instead of increasing the stability, was found to occasion unequal expansion and a slight "buckling," and the present holder will be throughout of one-eighth inch iron plates. The roof, which is supported by the gas when the holder is charged, will rest, when the vessel is empty, upon a timber frame not unlike the ribs of an umbrella, with simple struts between the beams. The usual cup and grip and water-joints will be adopted to render the tank and holder gas-tight. The total capacity of the new holder will be 5,678,000 cubic feet of gas, and the cost of tank and holder, including the necessary mains and connections, will exceed £50,000. — *The Building News.*

THE DESIGNS FOR THE BOSTON ART-CLUB BUILDING.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — For the benefit of your readers at a distance, who may be competitors, or interested in this competition, I send you some notes, partly critical and partly descriptive. As no official notice has been given as to which designs have been selected, I refrain from mentioning the several designs by their respective mottoes. The exhibition of the designs has not been open to the general public, but soon after they were hung, a notice appeared in the Boston *Herald*, whether with or without the sanction of the Club, I cannot tell, but certainly I consider such notices unfair to the competitors, inasmuch as attention is thereby drawn to certain designs, described by the writer as being among the best.

Like every other competition, the *noms de plume* become a very transparent covering to the real names of the authors, but without even knowing the authors, a cursory glance at the drawings will easily show that the best architectural talent of Boston and New York is conspicuous by its absence. This must be disappointing to the Art Club, but can be readily explained by the fact that the time of the best architects is too fully occupied by important work, to try the uncertainties of gaining more in an architectural competition.

A long experience of competitions has convinced me that on the whole they are very unsatisfactory. They may be the means of bringing youthful talent to the front, but an architect's executed works ought to be his best recommendation. The Art Club is to be commended highly for the manner in which the conditions of the competition were drawn up, so as to avoid as much mechanical labor as possible in the representation of ideas. With some exceptions, the instructions have been complied with, and I presume the transgressors will be placed outside the list of competitors.

The followers of "Queen Anne" are fully represented: some designs are Renaissance of a different type, a few are Gothic, and none are in any of the strictly classical styles. In the chaotic state of architecture as a fine art, it is perhaps extremely difficult to give an opinion as to what might be an appropriate style for a club building. I have met some members of the profession who say, Let us have Gothic for churches, classic for public buildings, and "Queen Anne" for houses; and I suppose these same individuals would have Moorish or Turkish art for Turkish baths. However, I have always had great respect for the opinions of the uninitiated in the mysteries of architectural art, so that the remarks I heard in the room, from a member of the Club, whilst looking at the designs, naturally impressed me deeply. He simply said that a lot of the designs "looked like country hotels." A club with an art-gallery, in which to give public exhibitions of pictures, ought to partake of the character of a public building. It ought to have some repose, breadth and dignity about it, and be as beautiful and refined as art can make it. I do not think these qualities are found in many of the designs. We know that "Queen

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Anne" is a style which can be treated in many different ways, but certainly it is inappropriate to treat a building of this class as a country house.

Many of the competitors exhibit designs in which the scale of the subsidiary parts to the whole is such that the building, if carried out, would lose the effect of size. Other Renaissance designs look like much larger buildings, compared with the former, owing to the subdivisions of their parts being on a smaller scale. Of the designs in this style, they cannot be said to show much improvement on former efforts, being for the most part weak or commonplace.

The planning in general is superior to the treatment of the exteriors, and shows great diversity. This was to be expected, as the instructions on this point left a good deal to the judgment of the competitors. There were to be two entrances, one public and another private, but as to which was to be most prominent, and whether they were both to be on Dartmouth Street, or one on each front, no suggestion was given. The billiard-room might be on any floor and of any size. I mention these things because a competitor at a distance, who knew nothing of the club membership nor its general working, would be placed at a disadvantage with, say, a local competitor who might be a member of the Club, and acquainted with all its requirements.

The position of the large hall on the second floor formed an important factor in the arrangement of the other rooms. The several plans exhibit this hall in every position. In one design the large hall extends across the whole length of the principal front, and covers about one-half the area. Externally this design shows a blank wall, broken only by some pilasters, and windows on the ground floor. Some of the designs have the outer wall of the large hall relieved by panels with sculpture, but in no case can the treatment of an unbroken wall with openings underneath be said to be very successful.

In more than one design the most valuable space on the first floor, at the angle of the site, is occupied with staircases, and one ingenious designer has made his stairs circular, the members' staircase being placed under the public one, occupies the same space on plan. The task of selecting six designs cannot be very difficult, for one-half of them are unsuitable, and after the designs that do not comply with the conditions have been separated from the remainder, the residue will leave little room for choice.

It will be interesting to note what alterations will be made by the selected competitors in the second competition, and how far they will profit by the ideas of their rivals. The last struggle ought to be a close one, and cannot be long delayed, as the Club gives evidence of being in earnest about building.

Yours truly, R. B.

THE NEW YORK CHAPTER A. I. A., AND THE EXAMINATIONS FOR DEPUTY INSPECTORS.

New York, 15 June, 1880.

To the Editor of the American Architect:

Sir, — I have just read the opening paragraph in your issue of the 12th inst.

The report of this branch of the Institute to which you allude mentions the fact that a special committee appointed by it to act in conjunction with the Mechanics' Exchange, reported that while regretting the paucity of eligible aspirants, they had recommended Mr. Robert McGinnis for the office of Deputy Superintendent of Buildings.

A. J. Bloor.

NOTES AND CLIPPINGS.

A Possible Cause of Color-Blindness. — A Belgian physician is reported to have ascertained, during a journey of observation and inquiry made at the request of the Belgian Government, that the very general and excessive use of tobacco is the main cause of color-blindness, an affection which has occasioned very considerable anxiety, both in Belgium and Germany, from its influence upon railway and other accidents, and also from the military point of view.

Manufacture of Sheet Lead in China. — The making of sheet lead for the lining of tea chests, etc., is a somewhat important industry of Hong Kong. It is made principally in sundry establishments to the westward. On entering one, workmen will be seen with shears busily employed in cutting out the sheets of lead into the required sizes and shapes. The shears are simply a large pair of scissors, firmly fixed to a solid block of wood some two feet in height. The lower blade of the shears terminates in a square piece of iron, instead of being pointed, as is the upper blade. The sheets of lead will also be observed to be of small size and somewhat irregular in shape, and this arises from the method of manufacture, as will subsequently be seen. Going further into the shop will be seen an iron pan raised twelve inches or so above the ground and carefully finished off. Beneath this iron pan is a furnace, and at the side of the pan next the wall is the flue communicating with it. In this pan the lead is melted, and when judged to be hot enough, the workman takes two of the large square paving tiles, which may be seen almost anywhere in the colony, and these are then smoothly and carefully covered with several layers of unsized paper. Having placed these two tiles before him, one above the other, the workman raises the upper tile with his left hand, and, taking a ladle of the proper size in his right, he dips it in the melted lead and then pours its contents on to the lower tile. He then drops the upper tile and quickly presses the lead out into the form of a sheet. The paper being a bad conductor of heat, the lead does not solidify immediately it leaves the ladle, and, as by long practice the workman always ladles out exactly the same quantity of lead, the sheets made vary but little either in size or thickness. — *Metal Worker.*

Statue of the French Republic. — The second competition for the great statue of the Republic to be erected at Paris has resulted in the selection of the figure designed by M. Morice.

A Tunnel under the St. Lawrence. — A bill has been introduced into the local Legislature of Montreal to incorporate a company to construct a tunnel between the north and south banks of the St. Lawrence at that city. The tunnel is to be used by provincial and American railways, as well as by vehicles and pedestrians. The capital is $5,000,000. Five years will be required for the completion of the work, if it is ever begun. The Grand Trunk is offering vigorous opposition in the interest of Victoria bridge, of which it has a monopoly, and charges such high tolls that other means of outlet from the city are absolutely necessary.

One Use for Sawdust. — A Western exchange says that sawdust can be converted into a liquid wood, and afterwards into a solid, flexible and almost indestructible mass, which, when incorporated with animal matter, rolled and dried, can be used for the most delicate impressions, as well as for the formation of solid and durable articles, in the following manner: immerse the dust of any kind of wood in dilute sulphuric acid, sufficiently strong to affect the fibres, for some days; the finer parts are then passed through a sieve, well stirred and allowed to settle. Drain the liquid from the sediment, and mix the latter with a proportionate quantity of animal offal, similar to that used for glue. Roll the mass, pack it in moulds, and allow it to dry.

Mr. Street as an Anti-Restorationist. — Not content with obliterating the art and history of St. Mark's, the authorities have begun to clean and restore the Ducal Palace! "The weather stains (says Mr. Street) are being cleaned from the exquisite capitals, and much new work is being done." Poor palace! We really are very sorry to hear of such sad work. . . . There was once a little cross church in Somersetshire of great interest to us. We sketched it, and measured it, and photographed it, till one fine day passing by we found it had been "restored." A curious passage cutting diagonally from the north transept to the chancel *had been wholly swept away*, moreover it was a mediæval piece of work and had many weather stains on its picturesque three-cornered roof. Mr. Street was the architect. Between the simple village church in England and the fine buildings of Venice there is really no more comparison than between a little ewe lamb and the beautiful daughter of Eliam. — *The British Architect.*

Gas Fixtures and Mirrors. — In McKeage *vs.* Hanover Fire Ins. Co., New York Court of Appeals, April 20, 1880, it was held that gas pipes which run through the walls and under the floors of a house are permanent parts of the building; but fixtures attached to those pipes where they are simply screwed on projections of the pipes from the walls, which can be detached by simply unscrewing them, are not. Neither are mirrors, put up after a house is built, supported in their places by hooks and supports, some of which are fastened with screws to the wood work and others driven into the walls and capable of being detached without injury to the walls. Such articles are not appurtenances. And the mere declaration of the owner that he intends that such articles shall go with the house does not make them realty, nor does the purchase of them with the house, as between a mortgagee under a mortgage from the purchaser and his lessee, even though the mortgagor, when negotiating for the lease, represents that they go with the house, no mention of that fact being made in the mortgage. And a purchaser from the mortgagor, without notice of such articles, would not be bound by the equities which might exist between the mortgagor and mortgagee by reason of such representations. — *Albany Law Journal.*

Cleopatra's Needle. — The New London (Conn.) *Telegram* has received a letter from Henry E. Davis, of Noank, who acts in the capacity of superintendent of removal to the party engaged in the attempt to bring the Egyptian obelisk to New York. Writing from Alexandria under date of May 11, Mr. Davis says that the original plan was to move the obelisk through the city of Alexandria on a truck which was brought from America for that purpose. The authorities, however, would not permit this, fearing that it would damage the sewers. It was then determined to build a float and lower the Needle onto it. This plan was successfully carried out, and the float was launched on the 30th of March last. It was simply a box, 83 feet long, 22 feet wide, and 8 feet deep, very strongly constructed. At the date of Mr. Davis's letter, the obelisk was in the dry-dock and the float had been demolished. The ship in which the obelisk will be brought to New York was expected to go into dock in a few days. An opening will be made in the bows sufficiently large to admit of the introduction of the Needle, which will be run in on cannon-balls, and the opening will then be closed up. It was expected that the ship would be in dock about six weeks, and that only a few days additional time would be required to complete all the preparations for her departure. After the obelisk was launched, the ways were reconstructed and a barge hauled out, on which were placed the pedestal and foundation stones. The pedestal was on board the ship at the date of Mr. Davis's letter. It weighed 44 tons, and was hoisted and lowered by means of derricks. Concerning the Masonic emblems on the Needle, about which there has been so much controversy, Mr. Davis writes as follows: "The Masonic emblems, about which there has been so much controversy through the papers, are, without doubt, genuine. You will see that the foundation is composed of three steps, the mystic number in Masonry; and inside of these steps was found the square, which is of granite, the same as the obelisk; also, the perfect ashler and the rough ashler, they are granite; the lamb-skin is of the whitest of marble; the square and perfect ashler are polished; the trowel is perfect in shape, although rather rusty; the steps are limestone, that has evidently been subjected to volcanic action at some period of the world, as they are very hard and take a fine polish. Mr. S. A. Zola, the Grand Master of the Grand Lodge of Egypt, says there is no doubt of their being purely Masonic, and he is considered the best authority in Egypt."

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BUILDING INTELLIGENCE.

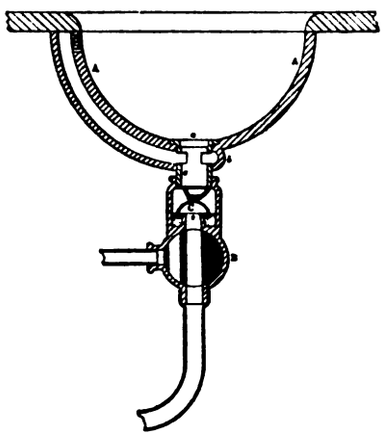
[Reported for The American Architect and Building News].

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

226,519. WASH-BASIN TRAP.—Jesse L. Hutchinson Baltimore, Md. A is the wash-basin, and B a cleansing-cock substantially the same as that shown in letters patent No. 215,928, granted to the inventor in 1879. The cock forms a part of the waste-water pipe, and is secured over the end of the metal casing, *a*, of



the nozzle *b*; and to adapt this cock as a portion of the present improvements, around the inlet-opening in the same is formed an annular projection, *c*. C is a bell suspended from the metal casing, *a*, of the waste-water nozzle, *b*, in such a manner as to allow the waste-water to pass around it. The said bell fits loosely over the annular projection, *c*, and forms, in connection with the water, which is at all times retained between this projection and the outer casing of the cock, a trap which prevents the upward passage of foul air. It will be understood that if desired the annular projection, *c*, can be used in the waste-pipe, and the cock, *b*, omitted.

228,435. EASEL.—Alpha R. Beal, Newton, Mass.

238,437. MONKEY-WRENCH.—Stephen H. Bellows, Athol, Mass.

228,443. SKYLIGHT.—Frank M. Campbell and Anthony C. Dunlevy, St. Louis, Mo.

228,464. APPARATUS FOR DRYING SHINGLES.—Willard A. Kitts, Oswego, N. Y.

228,467. IRON PILE.—Isaac W. Maclay, Metuchen, N. J.

228,468. THEATRE-STAGE.—Marshall H. Mallory, New York, N. Y.

228,471. SASH-LOCK.—Sparrow M. Nickerson and James P. Tansey, Chicago, Ill.

228,472. SASH-LOCK.—*The same.*

228,473. ELEVATOR.—Wm. I. Page, Boston, Mass.

228,475.—STEAM-HEATER.—John B. Pierce, Buffalo, N. Y.

228,518. PORTABLE AND ADJUSTABLE STAGING.—Alfred Dawes, Chelsea, Mass.

228,523. FASTENER FOR MEETING-RAILS OF SASHES.—Albert E. French, Detroit, Mich.

228,526. WEATHER-STRIP.—Daniel L. Grant, Philadelphia, Penn.

228,569. LATCH.—William E. Sparks, New Britain, Conn.

228,587. MODES OF FORMING HARD-FINISH ON PLASTERING.—William Arrouquier and Thomas Barrett, Worcester, Mass.

228,591. PORTABLE ELEVATOR.—Horace H. Barnes, Dryden, Mich.

228,597. FLEXIBLE BAND FOR BENDING WOOD.—Edward L. Buckingham, Jefferson, Wis.

228,604. WEATHER-STRIP. John M. Ceis, Albilene, Kansas.

228,607. DOOR-HANGER.—Joseph W. Coburn, East Walpole, Mass.

228,616. RADIATOR.—John DuBois, DuBois, Penn.

228,647. FIRE-ESCAPE LADDER.—John F. H. King, Port Richmond, N. Y.

228,661. STRAINER FOR PRIVY-WELLS.—Barsheba Mensch, Philadelphia, Penn.

228,674. SEWER-GAS TRAP.—Albert F. Pflughaupt, Jr., of Brooklyn, N. Y.

228,707. PIPE-WRENCH.—William C. Westerfield, Chicago, Ill.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS.—The following building permits have been issued since the last report:

Chas. A. Flack, three-st'y brick building, cor. Fulton Ave. and Patterson Ave.

Jacob Saums, 8 two-st'y brick buildings, Prince St., between Pulaski and Smallwood Sts.

Mr. John Kelso, 2 three-st'y brick buildings, High St., between Hillen and French Sts.

E. W. Gorman, 6 two-st'y brick buildings, Burk St., between Canton and Eastern Aves.

Michael Ryan, three-st'y brick building on Arlington Ave., between Lanvale St. and Lafayette Ave., 19′ x 60′.

Boston.

BUILDING PERMITS.—*Wood.*—*Gilbert St.*, Ward 23, for M. F. Nolan, 1 dwell., 23′ x 30′; D. Drew, builder.

Market St., Ward 25, for Sawyer, Hollis & Co., 1 ice-house, 50′ x 50′; Stephen Holmes, builder.

Union Ave., Ward 23, for B. F. Sturtevant, 1 building for preserving castings, 50′ x 50′.

Brick.—Cor. Beach St. and Harrison Ave., for J. D. W. Joy, 1 office-building, 30′ x 94′, three stories; I. C. Cooper, builder.

Union Ave., for B F. Sturtevant, 1 factory for castings, 39′ x 90′; C. W. Cole, builder.

St. James Ave., for T. W. Emerson, 1 dwell., 22′ x 46′, three stories; A. H. Caton, builder.

Marlboro' St., No. 180, 2 dwells., 25′ x 62′, three stories; S. Stillings, builder and owner.

Kneeland St., cor. Utica St., for Boston & Albany R. R., Passenger Station, 140′ x 119′; A. R. Estey, architect; W. H. Russell, builder.

THEATRE.—Mr. Halleck proposes to build a theatre at City Point.

Brooklyn.

ADDITIONS.—*Grace Court*, one-st'y brick extension, 17′ 3 x 33″; cost, $2,000; owner, Josiah Dow; architects, Field & Son; builders, J. Brown and T. W. Jones.

Hicks St., No. 122, two-st'y brick extension, 15′ x 29′; cost, $1,800; owner, R. T. Hicks' estate, Henry St., cor. Clarke St.; mason, J. W. Campbell.

BUILDING PERMITS.—*Tompkins Ave.*, cor. Lexington Ave., 1 three-st'y brick store and tenement, 29′ 4″ x 52′ x 36′ 7″ x 52′; owner, Peter N. Wholers, cor. Myrtle Ave. and Walworth St.; architect, Isaac D. Reynolds; builders, M. J. J. Reynolds and S. C. Whitehead.

Boerum St., No. 81, three-st'y brick factory, 45′ x 20′; cost, $3,000; owners, Tumann & Co., 67 Chatham St.; builder, C. L. Johnson.

Ramsen St., No. 40, one four-st'y Conn. sandstone and brick dwell., 25′ x 68′ 4″; cost, about $20,000; owner, A. T. White, 63 Broadway, New York; architects, Wm. Field & Son; builders, J. W. Hogencamp & Son, and McGuire & Sloane.

Quincy St., 3 three-st'y brown stone dwells., 15′ 8″ x 43′; cost, $12,000; owner, etc., Benjamin Linekin, 216 Greene Ave.

Marcy Ave., 3 three-st'y brown stone dwells., 20′ x 40′; owner, Stephen Phillips, 623 Willoughby Ave.

Pier between South Fifth and South Sixth Sts., 1 two-st'y brick storehouse, 200′ x 225′; cost, $5,000; owners, Havemeyer & Elder; architect, Theo. H. Havemeyer; builders, Thos. Winslow and J. James.

Ewen St., cor. Stagg St., 1 four-st'y brick store and tenement, 25′ x 54′; owner, John Trimmes, cor. Stagg St. and Boulevard; architect, Th. Engelhardt; builders, G. Lehrain and C. Wieber.

Broadway, 1 three-st'y brick store and tenements, 75′ x 90′ and 75′; owner, H. Battermann, cor. Ewen St. and Broadway; architect, Th. Engelhardt.

HOSPITAL.—The corner-stone of the new Eastern District Hospital and Dispensary was laid last week. C. C. Buck, architect.

Chicago.

BUILDING PERMITS.—Walker's Empire Dock Company, Robey St., two-st'y office, 24′ x 40′; cost, $2,800.

H. Ruchenbuiser, 649 Franklin St., two-st'y dwell., 22′ x 50′; cost, $2,600.

E. R. Rogers, cor. Ontario and St. Clair Sts., two-st'y dwell., 24′ x 50′; cost, $6,000.

W. T. Baker, cor. Michigan Ave. and Twenty-Third St., three-st'y and basement dwell. and store, 50′ x 90′; cost, $50,000.

H. E. Walker, cor. Indiana Ave. and Twenty-Ninth St.; three-st'y brick; cost, $12,000.

Jacob Steiner, cor. Clayton and Morgan Sts., two-st'y brick dwell. and store, 30′ x 82′; cost, $5,000.

A two-st'y dwell. for C. J. Hall, 24′ x 53′, at 267 Forquar St.; cost, $3,500.

C. Robb, at No. 312 East Jefferson St., a two-st'y brick dwell., 36′ x 48′; cost, $4,000.

C. Johnson, cor. Webster Ave., a two-st'y brick building, 24′ x 60′; cost, $4,000.

Aug. Gantz, 699 Wells St., a two-st'y brick dwell.; cost, $3,500.

Thomas O'Connell, a three-st'y store and dwell., Nos. 365 and 367 Blue Island Ave.; cost, $7,000.

E. B. Washburn, an addition to dwell., cor. Maple St. and Dearborn place; cost, $8,000.

Albert Koerner, a two-st'y dwell., No. 48 Bunker St.; cost, $3,000.

Mr. Wherle, 5 three-st'y dwells., cor. of Thirty-Seventh St. and Vincennes Ave.; cost, $25,000.

Joseph Medill, a two-st'y dwell., cor. of Cass and Ontario Sts.; cost, $20,000.

Conrad Seipp, three-st'y dwell., cor. State and Goethe Sts.; cost, $20,000.

Cincinnati.

BUILDING PERMITS.—The following building permits have been issued during the month of May:—

Forty-two (42) permits for repairs; total cost, $12,805.

Total permits for the month, 71.

Total cost for the month, $194,505.

Total permits to date, 285.

Total cost to date, $696,080.

New York.

ALTERATIONS.—*Madison Ave.*, cor. Fortieth St.; interior alterations; cost, $6,500; owner, E. Browning; architects, Gambrill & Ficken.

Chatham St., cor. Baxter St., five-st'y brick extension, 17′ 10″ x 9′ 6″; cost, $2,500; owner, S. V. Hoffman; architect, John B. Snook.

Broadway, Nos. 565 *and* 567, new iron and plate glass show windows on first story front and on Prince St., etc.; cost, $6,000; lessee, Max Stadler; architects, West & Anderson; builders, Robinson & Wallace and Fred. Robinson.

West Nineteenth St., No. 120, stable to be changed to a tenement and store, building to be raised to four stories; cost, $5,500; owner, E. Jansen; architect, Wm. José.

Fifth Ave., No. 428, two-st'y brick extension on rear, 16′ x 24′; cost, $2,500; owner, Charles G. Landon; architect, Charles M. Youngs; builders, Joseph Thompson and Edward Vreeland.

West Twelfth St., No. 219, three-st'y and basement brick dwell., pitch of roof to be changed; also a two-st'y brick extension, 21′ x 12′; cost, $2,150; owner, estate of Wm. C. Rhinelander; mason, H. M. Reynolds; carpenter, G. C. Moore.

East Fifty-Fifth St., Nos. 59 *and* 61, two four-st'y brick dwells., additional story to be built upon each rear extension; cost, $2,200; owners, J. N. Ewell and Robert B. Holmes.

Chambers St., cor. West Broadway, new front to be put in first story; cost, $2,000; owner, Thomas Hope; architect, John B. Snook.

William St., No. 215, front to be rebuilt on new line; cost, $3,500, owner, Mrs. C. Ceragioli; masons, Peter Tostevin's Sons; carpenter, Guy Culgin.

Broadway, cor. Broome St., additional story to be built; cost, $8,000; owner, ——— ———; architect, Stephen D. Hatch.

West Thirteenth St., No. 158, two-st'y and basement brick extension, 20′ 6″ x 20′; cost, $2,000; owner, Mrs. M. C. Blanck; architect, C. H. S. Hart; masons, W. & S. Conover; carpenter, Edward Gridley.

BUILDING PERMITS.—*Third Ave., No.* 349, 1 five-st'y brick tenement, 25′ x 66′ 3″; cost, $16,000; owner, Peter Keller, 349 Third Ave.; architect, Julius Kastner.

Fourth Ave., 1 two-st'y frame storage house, 50′ x 100′; cost, $2,000; owner, E. C. Gates, on premises; builder, A. Towers.

Forty-First St., Nos. 517 *and* 519, 1 six-st'y brick factory, 50′ x 97′; cost, $18,000; owner, William Campbell, 515 West Forty-First St.; architects, Thom & Wilson; builder, G. W. Hill.

Fifty-Fourth St., 1 three-st'y brick stable, 25′ x 70′; cost, $12,000; owner, Robert Lynd, 50 West Fifty-Fourth St.; architect, John F. Wilson.

One Hundred and Eleventh St., No. 319, 1 two-st'y brick dwell. and office, 25′ x 36′; cost, $4,000; owner, Ratge Bunke, 309 East One Hundred and Eleventh St.; architect, A. H. Blankenstein; builder, H. Harker.

Union Sq., 1 four-st'y brick store, 30′ x 90′; cost, $25,000; owner, G. Schirmer, 701 Broadway; architects, D. & J. Jardine; builder, C. Eberspacher.

Thirty-Fourth St., 1 three-st'y brick dwell. and office; cost, $6,000; owner, East River Ferry Co.

West Thirty-Third St., No. 450. five-st'y brick (brown stone front) tenement, 30′ x 82′; cost, $15,000; owner, James McDonald, 446 West Thirty-Third St., architect, Wm. José.

Lexington Ave., cor. One Hundred and Thirteenth St. and southwest cor. One Hundred and Fourteenth St., 2 three-st'y brick (brown stone front) dwells., 17′ 7″ x 45′; cost, $10,000 each; owner, Ann E. Davis, One Hundred and Fifty-Eighth St., Kingsbridge Road; architect, J. H. Valentine; builder, J B. Davis.

Lexington Ave., 10 three-st'y and basement brick (brown stone front dwells.), 16′ 8″ x 45′; cost, $9,000 each; owner, architect and builder, same as last.

One Hundred and Tenth St., 2 four-st'y brick tenements, 25′ x 60; cost, $10,000 each; owner, E. M. Meehan, 131 East One Hundred and Ninth St.; architect, Andrew Spence; builder, H. Meehan.

Sixty-Third St., 3 four-st'y brick (brown stone front) dwells., 16′ 8″ x 55′; cost, $15,000 each; owner, James Campbell; architect, Fr. S. Barus.

One Hundred and Nineteenth St., 2 three-st'y brick (brown stone front) dwells., 12′ 6″ x 50′; cost, $6,000 each; owner, Martha White, One Hundred and Thirty-Eighth St., near St. Ann's Ave.; architect, Chas. Baxter.

Eighty-Eighth St., 1 three-st'y brick apartment house, 22′ x 56′; cost, $10,000; owner, Emma J. Johnston, Astoria, L. I.; architect, John C. Burne.

East One Hundred and Twenty-First St., Nos. 329 *and* 331, 1 one-st'y frame school-house, 40′ x 80′; cost, $2,100; owners, Bethel Sunday School Association.

Washington St., 3 three-st'y brick stores, 18′ 9″ x 45′ x 50′; cost. each, $7,500; owner, Edward L. Donnelly, 259 West Twenty-Third St.; architect, Joseph M. Dunn; builder, Michael Reed.

Madison Ave., cor. Sixty-Second St., six four-st'y brick (brown stone front) dwells.; cost, (average) $24,500; owner, architect and builder, Charles Buck, 63 East Forty-First St.

One Hundred and Twenty-Sixth St., 2 three-st'y brick (brown stone front) dwells., each 12′ 6″ x 55′; cost, each, $7,000; owner, E. Pelham, 574 Lexington Ave.; architect, Geo. B. Pelham; masons, Van Dolsen & Arnott; carpenters, Jeans & Taylor.

One Hundred and Fifteenth St., 7 three-st'y brick (brown stone front) dwells., each 16′ 6″ x 46′; cost, each $7,000; owner, Christopher Keys, on the premises; architect, John McIntyre.

One Hundred and Twenty-Fourth St., 1 four-st'y brick (brown stone front) dwell., 16′ 8″ x 50′; owner, Patrick McKegney, One Hundred and Twenty-Fourth St., between Seventh and Eighth Aves.

One Hundred and Fourteenth St., 5 four-st'y brick (brown stone front) apartment houses, each 21′ x 60′; cost, each $13,500; owner, Joseph Emerich; architect, John F. Wilson.

COLOSSEUM.—Gilmore's Garden is to be replaced by a colosseum, to be built by the Barnum Museum Company, which was incorporated at Albany on the 7th. The capital stock will be $3,000,000, divided into 30,000 shares, of which Mr. Vanderbilt has secured $250,000 worth. The company has purchased the entire block on Madison Square for $800,000, and will at once proceed to build an immense structure, which will include a colosseum, an opera house, several smaller entertainment rooms, a museum, a tropical garden, and an observatory, to be managed by Mr. P. T. Barnum. The building will be 200 by 225 feet, and will be five stories in height, of brick, stone, and iron. The observatory tower will be 250 feet high, and the structure will be fire-proof. The architect's plans will soon be made public.

FACTORIES.—Messrs. Smith & Howe have prepared

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plans for a factory for General Spinola, to be built on Eighteenth St., between Avenues A and B. It will be three stories high, and cost $20,000.

Mr. W. R. Wood will have a factory built on premises Nos. 283 and 285, Front St.

GERMANIA THEATRE. — Messrs. H. J. Schwarzmann & Co., have completed designs for the Germania Theatre. It will have a frontage of 80 feet on Third Ave., and 150 on Fourteenth St. The main front will be of stone, other parts of brick with stone finish; adjoining will be a concert hall, of iron, 84′ x 103′. The total cost will be about $300,000.

PARK THEATRE. — The alterations lately mentioned, will include a new front; the cost, including decorations, will amount to $20,000.

STORES. — Messrs. Thom & Wilson have drawn plans for three stores on One hundred and sixth St., corner Third Ave; brick fronts.

VESTRY-OFFICE. — The vestry-office of Trinity Church, at the corner of Fulton St. and Church St., is to be altered and repaired, at a cost of $2,000; Mr. R. Deeves, contractor.

Philadelphia.

BUILDING PERMITS. — *Huntingdon St.*, 9 two-st'y dwells., 14′ x 44′; J. R. Pyle, contractor.

Ridge Ave., three-st'y dwell., 17′ x 47′; C. C. Linahan, contractor.

Germantown Ave., No. 4715, two-st'y brick building, 13′ x 42′; C. K. Frankenfield, contractor.

Eleventh St., 15 three-st'y dwells., 16′ x 56′; H. R. Schock, contractor.

Commerce St., two-st'y stable, 40′ x 38′; Samuel Henderson, contractor.

Eighteenth St., cor. Federal St., three-st'y dwell., 18′ x 36′; Jno. O'Donnell, contractor.

North Twenty-Third St., Nos. 214, 216, *and* 218, three-st'y store-house, 30′ x 132′; W. L. Atkinson, contractor.

North Second St., No. 832, three-st'y brick building, 20′ x 59′; W. R. Farrel, contractor.

Craven St., No. 119, two-st'y office-building, 28′ x 31′; owner, Philip Griffiths.

Falls Lane, 2 three-st'y dwells., 40′ x 53′; contractor, John McGill.

Fifth St., cor. Lehigh Ave., 2 three-st'y dwells., 20′ x 50′; owner, Jacob Marsch.

Spruce St., No. 1914, three-st'y brick building, 16′ x 68′; E. Hentz, contractor.

Allen St., between Budd & Ludwig Sts., 7 two-st'y dwells., 14′ x 27′; Edward Gillen, contractor.

Trenton Ave., cor. Margaretta St., Frankford, two-st'y factory, one-st'y foundry, 87′ x 68′; W. H. Bilyen, contractor.

Twenty-Second St., cor. Mt. Vernon St., church alterations; A. A. Campbell, contractor.

Homan St., cor. Otis St., 6 two-st'y dwells., 16′ x 40′; E. C. Sheppard, contractor.

Fourth St., third and fourth story additions to factory, 54′ x 56′; J. S. Steel, contractor.

Economy Mills, Manayunk, third and fourth-st'y additions to factory, 70′ x 400′; Sevill Schofield, contractor.

Clearfield St., east of Sixteenth St., one-st'y factory, 32′ x 60′; W. Macher, owner.

Ridge Ave., Nos. 3252 and 3254, 2 three-st'y stores and dwells., 20′ x 50′; Chas. Bartle, contractor.

Bolton St., 5 three-st'y dwells., 14′ x 45′; J. L. Carre, owner.

Walnut Lane, cor. Germantown Ave., second-st'y addition to factory, 31′ x 65′; Thomas W. Wright, contractor.

Wilson Bros. & Co., architects, of this city, are now preparing plans for rebuilding the residence of B. K. Jamison, Esq., No. 3912 Walnut St., lately destroyed by fire.

Messrs. Cooper & Conard have purchased additional property on Market St., 22′ x 120′, with the intention of altering their dry goods house adjoining, on the northeast corner of Ninth and Market Sts.

HOSPITALS. — Measures are taking to secure money enough to build a new Homœopathic Hospital.

The Sisters of the Third Order of St. Francis are to build a new hospital at the corner of Broad and Mifflin St., which will be called St. Agnes' Hospital. White freestone will be the material, and the hospital will consist of a main building with two wings, capable of accommodating three hundred patients. It will be four stories high, counting the elevated basement. There will be a dwelling for the Sisters in the southwestern portion of the lot, fronting on McKean St.; a chapel in the rear centre, and the physician's dwellings on Mifflin St. The estimated cost of the whole is $100,000. Mr. E. F. Durang is the architect.

St. Louis.

BUILDING PERMITS. — Thirty-three permits have been issued since our last report, three of which are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows: —

Owners Name.	Use.	Stories.	Rooms.	Cost.
Lindell Railway Co.,	Stable	2	4	12,000
F. Meise,	Dwell.	2	4	3,000
P. F. Meyer,	Store.	3	3	7,000
Robt. J. Kilpatrick,	Foundry.	1	1	3,000
M. Manning,	Dwell.	2	10	4,000
E. B. Hanson,	Dwell.	2	18	10,700
Maxwell & Bro.,	Stable.	2	6	5,000
H. A. Cunningham,	Dwell.	3	6	6,000
J. J. Roselt,	Dwell.	2	12	3,500
C. Hesemann,	Dwell.	2	5	4,000

General Notes.

ALBANY, N. Y. — The old city-hall is to be replaced by one which is to cost about $200,000, and Messrs. Dickson, Wright and Ogden, of this city, Mr. Robertson of New York, and Mr. Richardson of Brookline have been in consultation with the commissioners.

ATHOL, MASS. — The building committee of the new church are in consultation with a New York architect, who will soon submit plans for inspection.

ATTLEBORO', MASS. — Geo. A. Dean is building a house on Main St., after plans by Walker & Gould, of Providence, R. I.; mason's work, Patrick Farrell; carpenter's work, Wilmarth & McKillop; cost, including stable, $14,000.

BRIDGEPORT, CONN. — A gymnasium, to cost $7,000, is to be built.

BROCKTON, MASS. — The First Congregationalist Society has voted to remodel and improve the church edifice, as recommended by the architect, Mr. T. W. Silloway, of Boston.

CASCADE, IO. — J. L. Conlin, of this place, is preparing to build a two-story brick residence, at a cost of about $3,000; F. D. Hyde, architect, of Dubuque, Iowa, is preparing the plans.

CLEVELAND, O. — Blackburn & Charlott, architects, report the following from their office:

A three-st'y brown stone front dwell., for Isaac Reynolds; cost, $14,000.

A two-st'y frame dwell., on Cedar Ave., for Isaac Reynolds; cost, $3,000.

A frame residence for Mr. Stanley, on Clinton St., 38′ x 63′; contract, day work.

Two-st'y fire-proof building for Cleveland Provision Company, 90′ x 42′.

Two-st'y frame dwell., for Norman Chamberlain, on Madison Ave.; cost, $5,000.

Alterations on Benj. Rose's dwelling, on Euclid Ave.; contract, day work.

Four-st'y brick building, for Cleveland Baking Co., 43′ x 123′; cost, $15,000.

COCKEYSVILLE, MD. — Mr. Geo. Archer, architect, of Baltimore, is preparing drawings for additions and alterations to Sherwood P. E. Church, to cost $5,000.

DENVER, COL. — Emmet Anthony, architect, has completed the plans and commenced the work upon the following buildings: —

A three-story store, the front of stone and iron, for M. D. Clifford; cost, $30,000.

Dwelling-house for Hon. Hermon Silver, Superintendent of U. S. Mint; cost, $12,000.

Dwelling-house, for Hon. Edward Pisko; cost, $10,000.

Dwelling-house, Appel Brothers; cost, $8,000.

DETROIT, MICH. — H. George & Son, brick dwell., Edmund St., near Brush St.; cost, $6,000.

H. George & Son, brick dwell., No. 35 West Montcalm St.; cost, $8,500.

Isabella M. Thomas, frame dwell., No. 59 Leverette St.; cost, $1,500.

Detroit Safe Company, addition to factory, East Fort St.; cost, $5,000.

FRESNO, CAL. — The corner-stone of the new Catholic church was laid June 20th.

HUDSON, N. Y. — Mr. E. C. Withers, of New York, is preparing plans for a brick residence to be built for the Rev. E. R. Atwill.

IDA GROVE, IO. — The town has voted bonds to build a $10,000 school-house.

LOUISIANA, MO. — Two handsome brick stores are in course of construction on Georgia St. One will be occupied by Dreyfus & Michael, and the other by Wald Bros.

LOUISVILLE, KY. — The foundation walls of the new Short Line freight depot, at First and Water Sts., are nearly completed. No building permit has been taken out, so the estimated cost of this improvement is not known.

The cost of building improvements made during last month, as shown by the permits, is $126,200, an increase in value of $17,350 over those of the same month last year.

A building for the Pictet Artificial Ice Company is building on Floyd St., under the charge of Mr. Clarke, architect. The building will be one story high, and will measure 42′ x 125′.

W. H. Robinson is to build a two-and-one-half-st'y brick dwelling on Broadway, between Floyd and Preston Sts.; cost, $3,000.

MECHANICSBURG, O. — The corner-stone of the new A. M. E. Church, corner of Race and Walnut Sts., was laid May 30.

MENTOR, O. — General Garfield's residence is undergoing a general remodelling. Messrs. Blackburn & Charlot, of Cleveland, O., are the architects.

MIAMISBURG, O. — The corner-stone of the new Catholic Church of St. Mary's of Good Hope was laid June 6. The building will measure 30′ x 85′.

MICHIGANTOWN, IND. — Robert West is putting up a two-story dwelling on his farm; cost, $3,000. J. W. Hammond, of Frankfort, is the architect.

MILLBURY, MASS. — The Millbury Savings Bank will build a brick block 77′ x 52′, with a room for both banks on the first floor.

MILWAUKEE, WIS. — The Industrial Exposition Association will erect a mammoth building, covering an entire block. Work will commence as soon as the architects can complete the plans.

MONMOUTH BEACH, N. J. — A $15,000 frame house is nearly completed for Mr. James M. Dunbar. Plans were drawn by Mr. F. C. Withers, of New York.

MORRIS, MINN. — The Episcopalians talk of building a church and a parsonage this season.

NEW MILFORD, MASS. — The First Episcopal Society accepts the gift of a church site from the late Miss C. E. Boardman, and will comply with her condition that the building shall be of stone.

NOBLESVILLE, IND. — A brick house which will cost $6,000 is to be built from the designs of B. V. Enos & Son, architects, Indianapolis.

NORTH ATTLEBORO', MASS. — Mr. H. N. Daggett has broken ground for a large store on the corner of High St. and Commonwealth Ave.

NORTHFIELD, MASS. — A seminary for young ladies will probably be finished the coming fall. It is of brick and granite, and will cost $25,000. The partitions also are of brick. The main building measures 42′ x 100′, and will accommodate fifty pupils. A. R. & E. S. Foster, builders, Messrs. Cber & Rand, of Boston, architects.

PATERSON, N. J. — For the Rogers Locomotive Works a fire-proof office-building, 25′ x 100′ three stories high, is to be built, from designs of Mr Chas. Edwards, architect, of Paterson. The building will be of brick.

POTTSVILLE, MASS. — The Catholic church is to be taken down and rebuilt.

WORCESTER, MASS. — Proposals for building the new city hospital, as designed by Messrs. Fuller & Delano, were received June 3.

Industrial.

LOCK HAVEN, PA. — At a citizens' meeting, sufficient money was subscribed to ensure a paper and pulp manufactory being built by Armstrong, Dixon & Co., of Philadelphia.

STAFFORD SPRINGS, CONN. — The Rawitsers are making an addition to their mill. They are also building three large tenement houses.

NEWMARKET, N. H. — The town is to exempt from taxation for ten years the mill to be built by the Newmarket Manufacturing Company, in which S. A. Haley is a director.

TRINIDAD, COL. — W. H. Walsh & Co. are building a new mill.

WOOD HAVEN, N. Y. — The Llalance & Grosjean Manufacturing Company are building two new brick buildings.

PHILADELPHIA, PA. — A cotton mill will be built on the site of the Empire Car Works.

PHŒNIXVILLE, PA. — Acker & Co. are building a new foundry.

HOUSATONIC, MASS. — The Monument Mills Company are building an addition, 100′ x 50′, four stories high. Back of that they will put a dyehouse, 118 feet long, an addition to the "Wawbeek" mill, 42 feet long, of the same width and height as the main mill, and a new bleach-house, 120 feet long.

CLANTON, ALA. — J. A. Maddox is building a mill.

Bids and Contracts.

NEW YORK, N. Y. — Mr. T. Kernan has been awarded the contract for building the Deaf and Dumb Asylum, corner Sixty-Seventh St. and Lexington Ave.

The Building Committee of the Stock Exchange have accepted the bids of Mr. Ed. Gridley, for carpenter's work; Messrs. Sinclair & Co., for marble front; and of Messrs. J. B. and J. M. Cornell, for iron work.

The Dock Department have awarded the contract for 5,000 bbls. of Portland cement to S. L. Merchant.

The contract for tiling St. Bartholomew Church, corner Forty-Fourth St. and Madison Ave. has been awarded to Mr. S. L. Merchant.

Publishers' Department.

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THE NEW ROCKAWAY BEACH HOTEL.

THE new Rockaway Beach Hotel is to be well heated by steam, not only for the comfort of the guests during the cold rains which come in the early fall, but so that it can be kept open during the winter. The success of Atlantic City during the past two winters gives promise that this novel plan of the enterprising proprietors will meet with success. The steam-heating is being done by Mr. W. H. Warner, of 114 Leonard St., N. Y., who has also the contract for Mr. Weston's apartment-house at Washington, mentioned in another column. Mr. Warner has just finished the Stevens office-building on Wall St., the new Phœnix Insurance Building in Brooklyn, and is doing some of the fine residences in the upper part of New York City and elsewhere.

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ONE of the last acts of Congress before the adjournment was to pass a bill providing for the appointment of a joint committee, consisting of three members of each house, who should, with the assistance of three experts, examine and consider what changes, if any, can be made in the Capitol building for the better accommodation of the Houses of Congress and the Congressional Library, "having in view especially the need of better ventilation, light, and exposure to the open air of the legislative halls, and the convenience of communication between them, and between them and the Library, and the need of greater space and better arrangement thereof for the Library." The experts, if they find any "practicable and beneficial" means of accomplishing the desired ends, are to prepare plans and estimates, and submit them to the committee, which is to report to Congress at the earliest possible time, and is also to report whether such a mode of providing for the Library is preferable to the erection of a separate building. The same committee is further directed to examine the question of a site for a separate Library building outside the Capitol, and to report upon the most suitable locations, and the probable cost of a proper site, and of a structure adequate to the permanent needs of the Library. The joint committee, as appointed, consists of Senators Voorhees, Kernan and Morrill, and Representatives Geddes, Cook and Claflin, all being members either of the Standing Committee on the Library or that on Public Buildings. The three experts are Mr. Edward Clark, Architect to the Capitol, and Messrs. J. L. Smithmeyer of Washington and A. R. Esty of Boston, both well-known practising architects. It is understood that the report is to be presented in December, so that the committee and its experts will have plenty to do meanwhile. The general feeling among those most familiar with the subject undoubtedly is that adequate accommodation for the Library collection can no longer be had within the Capitol building, unless by a deplorable disfigurement of its present beautiful proportions; but there are some who think otherwise, and it is well to have the question authoritatively settled.

THE other part of the problem presented to the experts is alone sufficient to give them steady employment for some months. How to bring the two chambers of Congress nearer to each other, to the Library and to the outer air, and at the same time provide for their better ventilation and lighting, without depriving them of any of the conveniences of their present location, is a question of no small difficulty. It is impossible not to sympathize with those members of Congress whom the shut-in closeness of the legislative halls affects with an oppression which no scientific ventilation can relieve, and who come, after a long session, to long for the freshness of the out-door breezes, and for a sight of the sky and sunshine in place of the muffled twilight which struggles through the ground-glass ceiling. But in rooms for such purposes it is obviously necessary to secure quiet and good acoustic quality at any cost, and the multitudinous noises of the outer world pouring in through open windows would be likely to render debate difficult. Perhaps the legislators would gain a cheerfulness and equanimity which might be reflected in their deliberations, but this would be a doubtful compensation for misapprehension and confusion.

MINNEAPOLIS has recently been the scene of a building accident, of which we have received several accounts, none of which seem to throw a very clear light on the causes to which the failure was due. The structure measured forty by one hundred and forty feet, and was enclosed with brick walls, sixteen inches thick to the first story, and twelve inches above, the whole building being but three stories high. A line of iron columns and girders extended through the middle in each story, standing on brick piers in the basement and dividing the floor into two spaces of somewhat less than twenty feet each. The first floor-beams were two inches by fourteen, twelve inches apart, and those of the second and third floors were two inches by twelve, ten inches apart. The basement piers were twenty-four inches square. The structure was hardly completed when the lessees began storing goods in it, and had accumulated some three car-loads of merchandise on the second floor when the floor and wall gave way almost or quite simultaneously, beginning at a point about eighty feet back from the street, the whole mass falling to the cellar. We do not find it easy from these data to account for the failure, although the Minnesota papers have no difficulty in laying the responsibility on the proper person, their conclusions as to the proper person varying, however, very materially. The foundation wall is said to have been weak, and a settlement of this would account for the result, but that it is shown to be still in perfect condition. The timbering was light for a storage warehouse, but a comparatively small load seems to have been placed upon it when the accident occurred, — certainly not the six or seven hundred pounds of distributed weight per square foot which should be required for actual rupture. The walls were, *if well anchored*, much more than equal to the actual strain placed upon them, although they should have been thicker to provide for future contingencies. Unless some feature of the framing may have made a certain spot in the floor unduly weak, the indications seem to be that the wall which failed was insufficiently anchored and braced to the floors, and being far too thin, considering its length, to stand unsupported, it collapsed much in the same way as that of the Madison Square Garden.

A STATE Board of Health of a very efficient kind seems to have been established in New York by the Act of May 18, 1880. Three Commissioners are to be appointed by the Governor with the advice and consent of the Senate, of whom two shall be graduates of legally constituted medical colleges, and of not less than seven years practice of their profession, and to them are joined the Attorney-General, the Superintendent of the State Survey, and the Health Officer of the Port of New York, together with three members of local boards of health, designated by the Governor; and the body so constituted is to take cognizance of the interests of life and health among the people of the State, and obtain and preserve sanitary statistics and information. The Board is also to supervise the State system of registration of births, marriages, and deaths, of prevalent diseases and vital statistics, and is to prepare and issue the necessary forms and establish suitable regulations, and may from time to time employ experts to make special investigations. A report is to be made on or before the first Monday in December of each year, setting forth the action of the Board during the year, and suggesting any further legislative action or precaution which may be deemed desirable. The liberal appropriation of fifteen thousand dollars per annum is made for the ordinary expenses of the Board, five thousand for special sanitary service, and three thousand for the salary of a secretary. The joining of the Superintendent of the State Survey to the Board is a valuable means of promoting its efficiency. Not only is that official an important and influential personage in the State, but his professional training should be of great service in suggesting means for the practical accomplishment of ends which the medical members find to be desirable.

THERE can be hardly any further doubt that the International Exhibition of 1883, in New York, will take place substantially according to the programme marked out for it. It is to be hoped that the public is not yet tired of universal exhibitions, which, indeed, appear to occur with unnecessary frequency; but whatever interest the display of manufactured products may lack will be made up by the variety and fascination which the great city of New York, more than any other

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perhaps, presents to the stranger. No site has yet been selected for the Exhibition buildings, we believe, or rather, the merits of two or three rival sites are under discussion. One point ought to be settled at once, that the confusion and dust of such an affair should not be allowed to invade the Central Park, which is far too small to spare the requisite room, and has no open space adequate to the grouping of the various structures, while a vast area of accessible and suitable ground extends from the Park to the High Bridge, many parts of which are by nature as attractive and picturesque as could be desired. In convenience of access to the exhibition, in whatever spot at the upper end of the island it may be located, New York, by reason of its elevated railways, far surpasses any other city in Europe or America. Twenty-five to thirty minutes will suffice to take the traveller from the remotest station in the town to the entrance gate, and the average time from the thickly settled regions will not exceed fifteen minutes. There are four parallel lines, and the stations are numerous, so that ten minutes walk at the utmost will be necessary to reach one, and the passenger is transported with great comfort and promptitude. These advantages must materially influence the financial result of the enterprise. While the busy man in Paris or Philadelphia could hardly reach and return from the exhibition grounds without devoting half a day to the undertaking, his counterpart in New York can accomplish the same at the cost of half an hour's time, and his visits will be more frequent in proportion to the ease with which they are made.

The Brooklyn suspension bridge, after a long interval of apparent inactivity, begins to grow rapidly, and promises are made that the structure shall be finished by the fourth of July, 1881. Part of the delay is accounted for on the ground that the height of the trusses had to be modified so that Pullman cars could go under the girders. We had an impression that the late Mr. Roebling advised strongly against using the bridge for the passage of railroad trains, and supposed that no provision for them would be made, but it would seem that something of the kind is now contemplated. Extensive works will, however be needed before trains can pass from any surface railroads now existing on either bank onto the new bridge, and perhaps it is not intended to use it in this manner at first. There is one way of utilizing, not the bridge itself, but its piers, which we should think would have occurred before this to those who have observed the striking manner in which they tower above the buildings of both cities when viewed from a distance; that is, to appropriate them as pedestals for colossal statues of such individuals or personified attributes as the sister cities might desire to honor supremely. We all know the artistic importance of bridge gateways in classic times, and the idea of a pair of colossi guarding the river from these mighty pedestals would be a subject as stimulating to the imagination as its realization would be impressive.

The Nicaraguan Government is reported as having ratified with wild enthusiasm the contract making the requisite concession for the inter-oceanic canal, and the preliminaries may be considered as well settled. The next step will be to raise the money for commencing the enterprise; a somewhat serious undertaking, we should imagine. It is impossible not to feel some curiosity to know what M. de Lesseps thinks of the progress of the scheme which seems to have overtaken, if it has not already outstripped his own. He is hardly the man to yield easily to rivals, and perhaps his financial resources surpass those upon which Mr. Menocal can count, not only by reason of the prestige of his own name, but because the community in which he lives is one much more disposed to risk its money in long and distant undertakings than our own; at the same time, it would be folly to build two canals, and some coalition of the parties is to be looked for. The hopes of the people of Nicaragua, in regard to the benefits to flow to them from the cutting of the canal, we trust may be realized. The Suez canal is said to have done little or nothing for the country which it traverses, but it must be remembered that there is a wide difference between the fertile forests of Central America and the Arabian desert, and there may be inducements at one place for vessels to interrupt their voyage, which would be lacking at the other.

Those who are interested in the course of the Eastern market for building materials should, we think, be cautious about accepting the recent considerable falling off in business and prices as a symptom of a further and permanent decline. Although the number of permits for construction issued in Boston has greatly diminished, this is partly due, no doubt, to the fact that most of the buildings undertaken early in the season were dwelling houses, all of which were pressed at the beginning in order to insure their completion before cold weather, and as the season advances contractors, who do not wish to leave their investments idle through the winter, or risk loss by frost, forego new enterprises; but several important buildings are projected in and about the city, which will demand large quantities of material for a considerable time to come. So far as lumber is concerned, not only is the demand for spruce, the ordinary framing timber in the East, likely to be at least equal to the average at the corresponding season in late years, but there are indications that the supply will be limited, on account of the prolonged drought, which in conjunction with the exceptional warmth of the early spring has kept the rivers in the forests so low that vast quantities of logs have not been, and probably will not be able to reach the saw-mills. Both from Maine and New Hampshire come complaints of scarcity of material at the mills, and unless heavy rains should liberate the stranded trunks, it seems probable that the price of this material will, on the whole, rather advance than decline.

Many people imagine that the enormous land grants to railroads, about which so much talk was made a few years ago, had nearly exhausted the territory which still remained for the Government to give away, and these will be surprised at some deductions made by the New York *Times* from the statistics of the General Land Office. From these it appears that about half the area of the United States, exclusive of Alaska, is still unsurveyed. Even of so old a State as Florida about one-fifth is yet unbroken wilderness, while the government engineer, the harbinger of civilization, has penetrated only a thirteenth part of the territory of Arizona, and but little farther into New Mexico. The famous State of Nevada, important as it is by reason of its mineral riches, has four-fifths of its area unsurveyed. The fertile and beautiful territory of Montana has an unoccupied area considerably larger than the whole of Great Britain and Ireland, and several others have as much or more. It is tempting to speculate on the future of so vast a country under the influence of the restless activity and ambition characteristic of its present inhabitants. Year by year the efforts to economize the resources once so prodigally wasted become more scientific and persistent. Especially is the crying need of the Western country for the restoration of the forests which prairie fires or other causes have gradually obliterated, on the point of being answered effectively; millions of trees are regularly planted each season, and cared for until capable of flourishing without further aid, and the number will soon be increased, while with this reclothing of the denuded earth may follow climatic changes of incalculable value.

The London *Builder* completes, in the last number received, its list of the signers of the memorial in regard to competitions, of which we have repeatedly had occasion to speak. It is rather a surprise to us to find so many of the most distinguished names in the profession among the signatures; not that we doubt their good-will toward the cause, but because men of eminent position, and advanced in years, have usually formed a network of ties and habits about themselves which makes them cautious about putting their own hands to anything which may tend to change the traditions of their profession, even for the better. They may in private advocate reforms, but as a rule they prefer to leave the accomplishment of the end to the younger generation. It is therefore all the more gratifying to notice the active coöperation in the work, of such men as Messrs. Blomfield, David Brandon and James Brooks, Professor Donaldson, Messrs. R. W. Edis, Ernest George, Micklethwaite, Penrose, and Seddon, the two younger Scotts, Alfred Waterhouse, and many others of perhaps equal note. It is no idle form which all these architects subscribe, but an agreement which with some, especially the more distinguished, practically means a voluntary renunciation of the advantage which their well-earned reputation gives them in contests with their less eminent fellows, in favor of fair and open rivalry, in which the best shall win. That this is no trifling sacrifice, those who have witnessed the manner in which, with laymen, a great name overbears even distinguished merit in obscure competitors will readily understand, and the sincere gratitude and esteem of the profession are due to those who, out of love of fair play, and desire for the advancement of art, have been willing make it.

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OLYMPIA.[1]—IV.

MENTION has been made of the Exedra of Herodes Atticus in the former notice. A marble bull was found here towards the end of the third season, evidently part of the decoration of the structure. It bears the inscription, "Regilla, priestess of Demeter (dedicates) the water and that which is about it to Zeus." Lucian relates in his Death of Peregrinus (19) that Herodes Atticus, the friend and teacher of Marcus Aurelius, built an aqueduct to supply drinking-water to Olympia; the thousands assembled in the Altis, low land upon the southern side of a hill without shelter from the blaze of the sun, had previously suffered greatly from thirst. It seems he dedicated this work in the name of his wife Regilla, perhaps at the time when he was endeavoring to display his sorrow for her death, which was held to have been owing partly to his fault. It was this ostentation of mourning which led to the erection of the Odeion at Athens, bearing his and her names. The position of the basin with the great commemorative niche behind it was conspicuous, northeast of the Heraion and balancing the Philippeion upon the other side. The water was conveniently offered to the crowds upon the great place between the two principal temples. The monument which was erected at the termination of the aqueduct was as grateful to the visitors to the Altis as cleverly arranged for the glory of the generous Rhetor

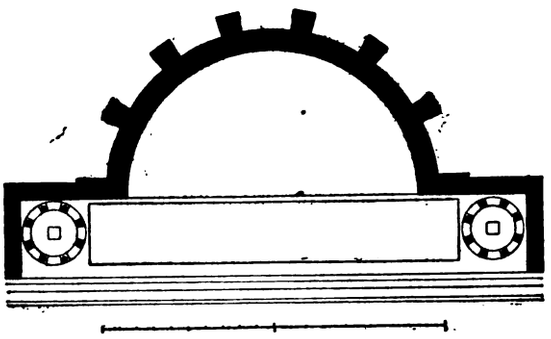

Fig. 5. Plan of the Exedra of Herodes Atticus.

and his imperial friends. The water, having been procured through pipes, partly above, partly underneath ground, from the valley of Miraca, about five kilometres distant, was discharged through two lions' heads of marble, fixed upon the walls of the hemicycle behind the basin. The reservoir into which it fell was 21.90 m. long, 3.45 m. broad, and about one metre deep. In the arc behind it, with a radius of 8.31 m., there stood the twenty-one statues of the family of Herodes Atticus erected by the grateful inhabitants of Elis, as well as those of Antoninus Pius and Marcus Aurelius, which the Rhetor had erected to his scholars.

The Exedra formed the background of the great place against Mount Cronion, which rises so steeply behind it that part of the arc is cut from its earth. The basin, upon a lower level, is flanked by two little round edifices, each a monopteros of eight columns, which protected the statues of Marcus Aurelius and Faustina. The diameter of their plan is only 3.80 m. the detail of their column and entablature is published upon the same plate, 37. The Corinthian acanthus capitals are very carefully cut. They are of Pentelic marble, as is the rest of the little structures, except the shafts, which are from Eubœan quarries. The roof-tiles were carved with a scale-like pattern of olive-leaves. The masonry of the Exedra, roughly and carelessly built, was richly veneered with different marbles. The brickwork, often interrupted by blocks of coarse limestone, is irregular, with large joints of mortar. The little side canopies were also badly cut and built, and of mediocre design. A restoration of the entire structure is promised for future publication. It is assumed that it was completed by a semi-dome, and reference is made to the analogous Roman exedra near S. Croce in Gerusalemme.

An especially interesting comparison is that of the plan of the Byzantine church and its ancient predecessor, the remains of which served as a foundation for the Christian builders. The church was quite well known from Plate 61 of the Expédition de Morée, first volume. It was uncovered again in the second season of the German excavations. The main results of that examination were reported by a note in No. 103 of the *American Architect*. Some details and the publication of the illustrations are presented in the third volume. After the French discovery of the building by M. Dubois in 1829, the ruins were again covered with earth. They are now found to have suffered considerably from the half century of neglect. The building was not large.

At the south there was an exterior porch of three double arches; those to the east have disappeared. From this steps go down to a narrow court, the pavement of which was on a considerably lower level than the accumulated earth without. This leads on the left to two plain chambers without windows, being lighted by a tripartite arcade above the doors. The division wall is unpierced. Before these rooms, which are supposed to have been used in connection with funeral rites, there is a broad stone bench. A second entrance to the court is provided by a door from the north. To its east there is a colonnade of five arches, the narthex, from which three doors lead into the three-aisled basilica. The nave is terminated to the east by an apse, in which there is a semicircular seat for the clergy, with an elevated throne in its middle. Before it stands the stone altar. Upon each side six-bayed arcades upheld the clerestory, if such it can be called, as it was probably without windows. The three westerly of the five supports were cylindrical Ionic columns; the other two on each side were a combination of a square pier and engaged

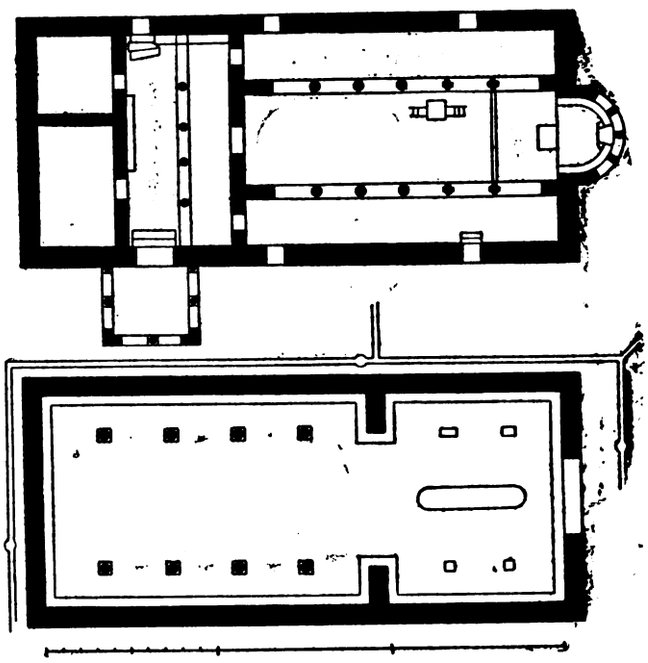

Fig. 6. Plans of the Byzantine Church and its Prototype.

shafts. Between those farthest east a balustrade worked of marble in early Christian forms separated the nave from the bema. A gate in the middle allowed an entrance to the altar. Upon the northeastern side of the nave the remains of a Byzantine chancel were found, ascended, as was customary, by steps from both east and west. There are four semicircular windows in the walls of the side-aisles, which seem to be older than the adaptation of the building to a church. The entrances to the court were similar windows, that upon the north having been but little enlarged. The southeastern window of the church has also been broken out for a passage. Though the pavement was not entirely removed, Christian graves were everywhere found: seven in the southwestern chamber, others in the court, the narthex, the nave and side-aisles, as well as in the earth of the immediate vicinity. As might be expected, there are many fragments of antique architectural members built into the church walls. The French found elaborately carved Corinthian capitals in the arcade walls over the narthex, more of these were discovered by the Germans, all from the rear of the Exedra of Herodes Atticus. Blocks of the Philippeion were employed for the floor of the nave, and deposited between the columns of the outer porch to serve as seats. It is not possible to determine from whence other remains were taken. Much as has been made known concerning the buildings of the Altis, our understanding is incomplete indeed. It is evident that the Byzantine church was long in use from the fact that there exist two pavements, one .43 m. above the other. The lower is of the better material. From the direct results of the excavations, and from a comparison with similar monuments of early Christian architecture in Greece and Asia Minor, the church is thought to belong to the first half of the fifth century. The porch is more recent. The entire foundation of the building and a very considerable part of the enclosure walls now standing are ancient. The interior division walls, those of the western chambers, those which separate the body of the church from the narthex, the arcades between the latter and the court, as well as those of the interior side-aisles, are not in any way connected by the blocks of their masonry with the original exterior walls, being built up blindly against them. At the time of the arrangement of the structure for Christian usage, the two short transverse walls which existed in the original interior were demolished. This is attested by the traces of their former juncture high up on the side. The antique substructure was of poros, as was also the first course of imposed masonry. The continuation of the wall above was brick. Only one entrance existed, a door of great width, 4.50 m., at the eastern end; its threshold still remains in position beneath the apse.

It was suggested in the publication of the second year's work that these foundations were the remains of a peribolos enclosure within the Altis. Now that the western boundary wall has been discovered, it is evident that the building stood outside, and it seems certain from the substructure and the remains of the brick walls existing that these were of considerable height. They are 1.12 m. thick, and their lower course is of carefully cut blocks terminated by a plinth moulding. The publication argues that they were more than low boundary walls, pointing to the fact that the Altis enclosure wall is

[1] Die Ausgrabungen zu Olympia. III. Uebersicht der Arbeiten und Funde vom Winter und Fruehjahr, 1877–1878. XXXVIII Tafeln, herausgegeben von E. Curtius, F. Adler und G. Treu. Berlin: Verlag von Ernst Wasmuth, 1879.

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only .56 m., just half their thickness, while the walls of the great temple of Zeus, which reached a height of 16 metres, were 1.33 m., and those of the Gymnasion, similarly built of brick, and 7 to 8 metres high, were only .64 m. thick. This ratio would make the walls upon this ancient foundation from 13 to 14 metres high. As the plan shows, the interior was divided into two parts by boldly projecting piers, or rather by a wall divided by an immense door, which must have reached to the ceiling. The space to the west is nearly twice as large as that remaining. Both were divided lengthwise into three aisles by ranges of supports parallel to the sides. There were eight cylindrical shafts in the larger space, which stood upon square abaci of stone. These columns remained underneath the pavement of the later church, cut off to stumps about half a metre high. They were .57 m. in diameter, and seem to have had no base-moulding. The four shafts of the smaller space have disappeared. Their footings remain in rectangular slabs of irregular shape which mark their position. In the middle of this eastern and front chamber, which is about square, there stands a trough, 6.08 m. long, 1.25 m. broad, rounded at the ends, and hewn from poros, with brick copings. It appears to have originally been higher, and levelled down to its present state with the columns at the time the first church pavement was laid. The structure of which these are the remains evidently dates from the Hellenic period. The general style of the construction is similar to that of the Gymnasion. Its floor is situated upon a very low level, 3.22 m. beneath the stylobate of the temple of Zeus; its details are plain to bareness. It is impossible to decide the original destination of the building, which must have been peculiar. The decided opinion of Adler is that we have here the remains of the celebrated workshop of Phidias, where the great master worked for years with his best scholars upon the chryselephantine statue of Zeus, designing and executing it under conditions as nearly as possible the same as those of the space in which it was ultimately to stand. This opinion he argues at length in the preface. The principal point of the theory is the general similarity of the dimensions of the plan with those of the naos of the great temple. The length of the former interior is 29.94; that of the latter, 28.63. The width of the enclosed spaces compare as 12.26 to 13.24; the widths of the central aisles as 6.75 to 6.52; the distance of the columns on centres as 3.78 to 3.50 m. The width of the doors is especially striking: that under the Byzantine church is precisely the same as that of the great temple. This indeed appears more than a mere coincidence. So large an entrance, 4.50 m., large enough to serve unaltered for the width of the Christian apse, is at least unusual for so small and, constructively, so unpretentious a building. The general arrangement of the interior seems to have been much the same in the two cases: galleries upon either side of its entire length, upheld by seven supports. The short cross walls stand in the same relative position as the first balustrade which is opposed between the great statue and those who enter the door of the temple. The great woollen curtain of the interior, "with Assyrian embroidery, and dyed with Phœnician purple," probably hung at this point. A door between the piers of the workshop may have served to close the inner space from the effects of the exterior. In case the design of the statue was here settled upon, it had doubtless an artificial illumination similar to that usual in the naos of the great temple. Without some interior enclosure this would have been disturbed by every one entering and opening the great door. A second isolation from the changes of temperature and hygrometric condition of the outer air would also be advantageous. And yet the effect of the entire length of the central aisle of the naos could at times be obtained by throwing open the wooden barrier at this point. The building was outside the Altis enclosure, as Pausanias describes the Ergasterion of Phidias, and yet as near as might well be to the great temple. Its walls are directed to the same points of the compass as those of the naos, and its door to the east would have allowed the transport of the colossal figure in a direct line to the temple. The statue would not have to be turned at all. It seems difficult to decide whether it was this orientation of the structure that led to its adoption for Christian ritual, or whether any weight may be laid upon the fact that it was this building, supposed, by the theory that it was a workshop, not to have been consecrated to any religious significance in antiquity, beyond the altar placed afterwards within it, which was chosen by the early Christians for their church in preference to the three temples of the Altis, then without doubt in a good state of preservation.

Though this recognition of the Ergasterion of Phidias under the Byzantine church is pleasing, it must for the present, at least, remain a hypothesis. Our knowledge of its destination is not sufficient for proof. From the lack of steps and exterior columns, as well as from its plain and practical construction, outside the Altis, it is evident that it was no temple. It may have been used as a bath, or for some purpose connected with the games and the Gymnasion. The water-works which surround it with their channels and reservoirs point to something of this kind.

It remains to mention the prostyle gate of the southwestern Altis enclosure wall. After the removal of the encumbering Roman or Byzantine brick aqueduct arches above it, it has proved to be a structure of good Greek period. The supports in the line of the wall, a combination of pier and column, are remarkable. Near their base the pivot-holes remain, which show the doors to have opened outward. More concerning the interesting structure is promised for future publication. Of the remaining buildings, the thirteen treasure-houses, the Gymnasion, the Buleuterion, the Prytaneion, the great festal gate of the southern enclosure wall of the Altis, the extensive colonnades without, and the brick ruins upon the Alpheios and Cladeos, as well as others the destination of which is not yet evident from the ruins, nothing beyond the small plans of the topographical map is given in this third year's report. The treasure-houses, represented by two Doric entablature details upon Plate 38, though varying much in size, are generally built upon the similar arrangement of a temple *in antis*. Situated at the foot of Mount Cronion they formed with the Exedra of Herodes Atticus and the Metroön, which stood before them, the northern background of the Altis. They extended for one hundred and twenty metres, from the Exedra to the subterranean entrance to the Stadion, which latter, as was to be expected from the description of Pausanias, was discovered at the eastern end of the terrace, closed by three portals. Further publications regarding these buildings and the Stadion and Hippodrome will be of the greatest interest.

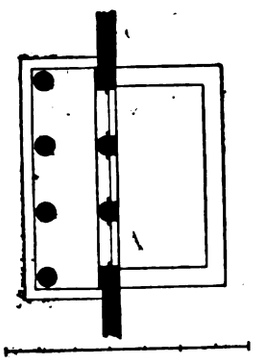

Fig 7. Plan of the South-western Altis Gate.

The architectural gains of the excavations at Olympia are difficult to estimate, — wholly impossible to express in a review. It almost seems as though the art of building had received the lion's share of the results. Beside the discoveries which increase and render more precise our knowledge of Greek architecture, there are, as before said, many important branches of it known alone by the ruins of Olympia. The changes which the buildings of various kinds experienced during antiquity, the restorations which were effected to keep them in repair or to modify their use, are peculiarly instructive. Above all, the masterly arrangement of grand masses of masonry, and of the places and passages between them, the creation of an imposing festal enclosure, can be to a great degree appreciated by study of the topography of the Altis, — now so settled as to allow an incomparable insight into the spirit of Greek architectural composition. This is not the place to touch upon the great gifts of the German excavators to archæological, epigraphical or sculptural specialties, or to enlarge upon the invaluable additions to our present civilization and culture, to our understanding of ancient writers, our appreciation of Hellenic art. The fifth season, now far advanced, was intended from the beginning to conclude the excavations. The sum which the Reichstag voted last year to defray the expense was given with the understanding that it was the last. German newspapers report, however, that the leaders of the expedition have petitioned the legislative body, recounting that which they have already accomplished, for the allowance of further credit for the completion of the work, as it was thought that the money in their hands would not suffice for the purpose. The desirableness of not allowing the undertaking to be hindered by want of funds is so great, that it would be fortunate if some discovery of exceptional importance were still to be happened upon, which might revive the interest of those statesmen who were only attracted to lend their support by the novelty of the excavations. In case the further subsidy should be refused by the Reichstag it may still be hoped that the 80,000 marks, which the German Emperor has recently devoted from private funds to the furtherance of the expedition, will suffice to conclude the examination of the Olympian plain. May the final publication of the results be exhaustive, — and not too long delayed by the other employments and dilatory habits of those to whose care parts of the report are entrusted.

J. T. C.

THE VENTILATING FIRE-PLACE.[1] — IV.

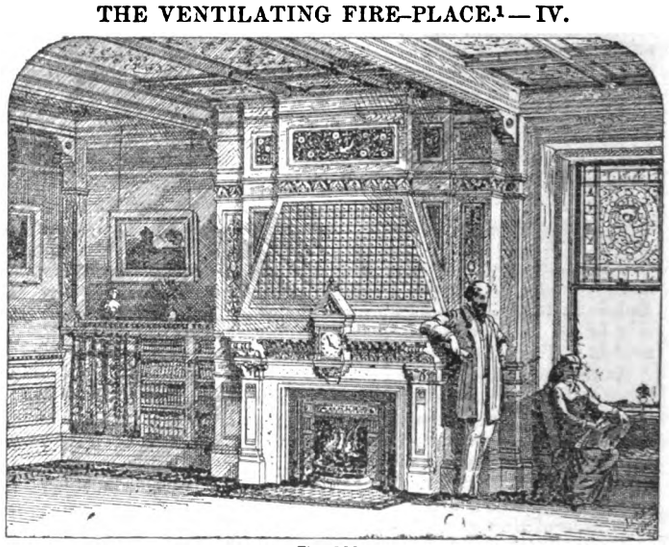

Fig. 203.

Fig. 203 gives the effect of the combination with the Jackson

[1] This paper, by the writer of the Open Fire-Place articles, will be incorporated with them in their separate form.

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fire-place in the library of a house on Marlboro' St., built by the writer in 1879. The heat of the fresh air rising from this fire-place was so great as to affect the carving on the frieze of the black-walnut

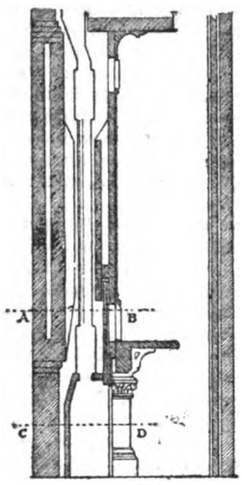


Fig. 204.

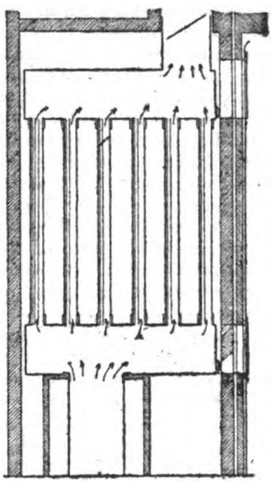
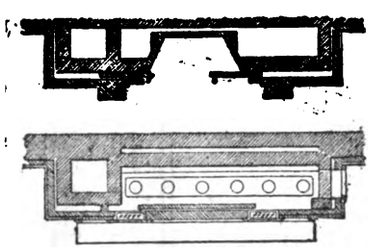


Fig. 205.

mantel, and, to provide against its destruction, he was obliged to design the cut brass hood shown in Figs. 201 and 202 to deflect the current of hot air from the woodwork.

Figs. 204–207 represent the form of distributor designed for the Adams Nervine Hospital. In this case the openings for cleaning out and for removing the distributor were made in the side instead of the front of the chimney-breast.



Figs. 206, 207.

Fig. 208 gives a perspective view of the writer's dining-room fire-place above described, showing the heater behind the hinged panel. Just over the mantel-shelf is the perforated panel for the admission to the air-chamber of the air of the room when the outer fresh-air register is closed. The

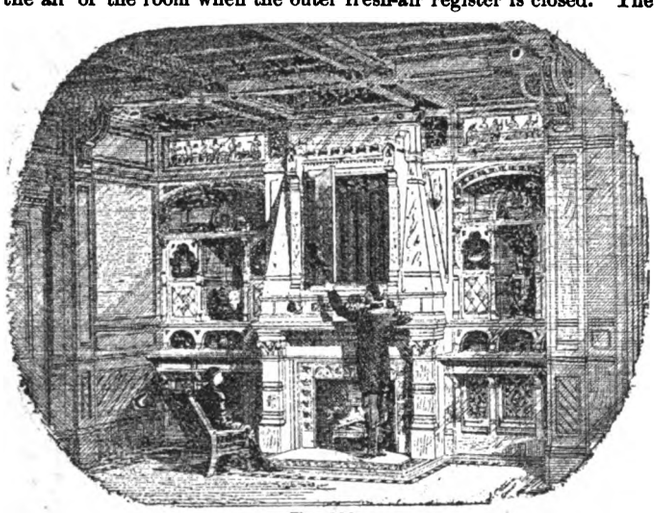
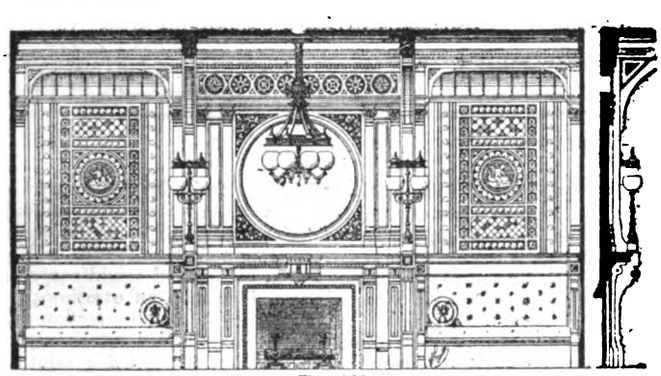


Fig. 208.

illuminated frieze over the side-boards is of stained glass lighted by windows behind.



Figs. 209.

Fg. 209 represents a hall chimney-piece in the house on Marlboro' Street, already referred to, showing another manner of decorating the hinged panels, fresh-air registers, ventilating gas-brackets and chandeliers.

When terra-cotta is used for the distributor, it may be cast in as many pieces as is convenient for the baking, (the pieces being made to couple together like sections of drain-pipe,) and are put up with weak lime mortar in such a manner that they may be taken apart at any time, if desired, without breaking the pipe. Cement or plaster of Paris would not allow of this.

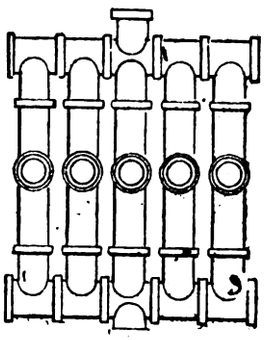


Fig. 210.

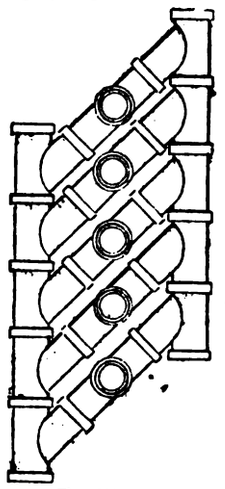


Fig. 211.

A good form for the apparatus is shown in Figs. 210 and 211, where the pieces are made like common drain-pipe, except that the arms of the Y and T joints are shorter, in order to bring the transverse pipes sufficiently near together. The pipes should be so large that either one alone would suffice to carry off the smoke, were the rest closed. Clean-out holes are made by using a T joint at the centre of each transverse pipe, with the opening turned toward the room. When in use these pipes are closed with earthenware covers held in place with just enough lime mortar to keep them in, and the air out. They may then be easily removed and the flues cleaned with an ordinary chimney brush or scraper.

HOUSE DRAINAGE.[1] — II.

Drains within the house walls are next to be considered. These demand still more care and skill than the drains outside. In the latter case the soil has certain absorbent powers, combining chemically with the products of decomposing filth, or holding air in its pores for the oxidation of the noxious compounds, which are thus rendered innocuous. Moreover, the poisonous influences within the walls are more likely to be absorbed by and act upon our systems through the lungs than if out of doors, and diluted more or less by the outer air. A New England climate does not admit of much fresh air being admitted into the houses of those who cannot afford to heat it during six months of the year. The suffering from frost is immediate, leading the poor man to calk up every crack, while the injury from bad air is a slow poison, warning us only by the sense of smell, a sense which soon becomes benumbed, and rarely becomes sufficiently imperative to lead to action. In fact, its importance is not appreciated by a large part of our population. They might perish with the cold if they let in the air, so they choose the chance of living without it. We must therefore expect bad ventilation among the poorer classes in cold weather. The volatile exhalations of the skin and lungs are not always so easy to get rid of as the fluid and solid excreta. But in getting rid of the latter, if we do not take great care, they too become gaseous, and return to plague us in the air already heavy with the exhalations of the lungs and skin.

The introduction of water-closets in tenement-houses should therefore be guarded with special attention, or the benefits to be derived from their use will be more than cancelled by the evils which may arise from their defective construction.

It must be remembered that houses situated on high places, though enjoying the advantage of good opportunity for drainage, may be more exposed than lower sites to the invasion of bad gases from drains and sewers, for the very reason that they are higher, for these gases are light, and are always tending upward. It is well known that the pressure in our gas-mains increases very perceptibly as we rise a hill, being about double the ordinary working pressure at an elevation of two hundred and eighty feet above the works, and although the gases in our sewers may not be so light as illuminating-gas,[2] they are somewhat lighter than ordinary air, and are therefore always tending upward by their buoyancy. This tendency is aggravated during the winter by the rarefied condition of the air within our houses, the ordinary heating of which always creates a slight inward pressure from the outside in all the lower stories.

[1] A lecture by Mr. Edward S. Philbrick, C. E., delivered before the students of the Massachusetts Institute of Technology.

[2] Ordinary illuminating gas has a specific gravity of .42, that of air being 1.00. The increase of pressure in gas-pipes as they extend up to a higher level, is due to the difference in weight between the air and gas for the height traversed: gas when distributed from the works is under a pressure of about 24 inches of water.

The weight of a cubic foot of water is 62.4 lbs.
" " " " of air is 0.08 "
" " " " of gas is 0.0336 "

Difference between air and gas equals 0.0464 lbs. per cubic foot.

We have then the following proportion: —

.0464 : 62.4 :: 1 : 1335 inches, or 111 feet elevation for one additional inch of water pressure.

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As a general rule, it is of course advisable to limit the length of the drains within the house walls to a minimum, for the reason that a large number of joints increases the risk of leakage. In planning the lines and course of drains, therefore, this should be kept in view.

In planning the general arrangement of plumbing fixtures, care should always be taken to have them arranged as *compactly* as consistent with convenience, and to avoid scattering them about in remote parts of the house, from which the drain pipes can rarely be collected and combined with a proper fall to guard against deposits being formed in them. It is also a matter of no small importance to place the drain and waste pipes so they can be readily accessible for inspection and repairs, without tearing up floors. Where located under basement floors, loose trap-doors should be left for access, and if the drain is necessarily below the surface of the ground it should not be buried, but walled in on each side by brick.

The material for drains within the houses should be of metal, in all cases. Stone-ware pipe cannot be trusted on account of their fragile and porous joints, through which gas can penetrate, though they may be impervious to water. For all main-drains and soil-pipes, cast-iron is the best material. It is made in lengths of six feet, with all the necessary special forms for joints, bends, etc. Its joints should be filled with melted lead, and well calked. Right-angled connections must be avoided, except in vertical pipes, for the same reason as has been given for outside drains. Oblique connections can always be provided for by arranging the lines of pipe for the purpose, if care be taken. Vertical lines of drain from water-closets, generally called soil-pipes, were formerly made of lead, and this material is still used in England. But iron has taken its place in this country for several years, with success. It has these advantages: Its rigid nature renders it less likely to get out of place than lead, which often sags and changes form. Lead is also more subject to corrosion from the gases existing in drains than cast-iron. Wrought-iron would rust away rapidly, but cast-iron rusts only on the surface, and seems capable of enduring for twenty years or more, while lead is often found badly corroded in ten years. The corrosion in lead takes place along the joints where in contact with the solder, probably from galvanic action, excited by the contact of the two metals. Lead is often exposed to damage, as is shown by these samples before us, taken from houses in this city, also from rats, which gnaw holes in it, and nails carelessly driven in securing the wood-work have often made holes that were not discovered for several years. The joints of iron pipe are sometimes put together with putty by poor workmen, but it can never be relied upon for any length of time. It soon crumbles away and becomes worthless. The lead should be applied nearly or quite at a red heat, so as to penetrate the thinnest parts of a joint without becoming chilled. When cooling, it contracts so much that it must be upset with calking tools, applied around the whole circumference.

The small waste-pipes from bath-tubs, bowls, sinks, etc., are generally made of lead, which is a very suitable material. Where entering the iron pipes, the joint is often made by applying hydraulic cement, putty, or red lead. But the proper way is to solder a brass ferrule to the lead pipe, which is inserted into the bell of the iron pipe. This gives a stiff material, against which a lead joint can be calked, in the same way as between two pieces of iron pipe. When lead traps are used under water-closets, the joint between these and the iron soil-pipes should be secured in the same way.

Every vertical line or "stack" of soil-pipe should extend through the roof of the house at least four inches in diameter, and far enough above the roof to ensure its end from being filled with snow. The end should be left wide open. If a smaller pipe than one four inches in diameter be used, the part projecting above the house roof will be liable to be filled with hoar frost on cold nights in our climate. With this arrangement a constant draught is maintained through the house-drains; entering at the vent-hole close to the outer trap, and passing up through the roof of the house. The temperature of the house in winter is always enough above that of the outer air to sustain this draught. In summer the sunshine on the upper end of the pipe will encourage it, for the hole at the lower end is below the surface, where the ground cools the air and thus renders it slightly more dense. This upward draught is reversed for a moment whenever a considerable charge of water is emptied into the drains from the upper stories of the house, for the water pushes the air down as it falls, and other air takes its place from the upper end of the pipe. If both of these holes are not kept open, trouble will be sure to follow the use of the drains, for the water rushes down the vertical pipes with considerable velocity, and if it nearly fills the pipe, it acts like a piston, to drive all the air in advance. If the free escape of this air were not provided for by the vent-hole at the bottom, the air within the pipe would be forced out at any or all the branch drain-pipes in the lower story, forcing their traps and blowing their contents up through the waste-holes in a very disagreeable manner. The puff of air that is thus driven out of the house-drain at its lower vent-hole by a descending charge of water from the upper stories, has sometimes been objected to on the ground of a possible offence arising from it at the mouth of the man-hole over the trap previously described, but this is not found to exist in practice. The air from a well-ventilated drain is not so foul as to pollute the air outside the house to any great extent, though when allowed to escape and taint the air *within* the walls, where the dilution is very much less, the result is much more serious. Moreover, as before explained, the escape of air at this lower vent is only by occasional puffs forced out by descending charges of water, while at all other times the draught is inward at the lower vent-hole. So that this very air which may have been forced out for a moment into the man-hole chamber, is again drawn up through the pipe and delivered at the top of the house above the roof, before it has an opportunity to escape from the top of the man-hole itself. Practically, no reason appears to exist why these vents should not be placed near the house, outside, in either the front yards, on the side-walk, or in the back yard, as the case may be. If the man-hole cover is liable to be covered with snow for any depth, an air pipe of four or five inches diameter should be led up from beneath the cover, to terminate a few feet above the ground, at the top of a back yard fence, or similar position.

The arrangement described above is essential to every house. By this means every part of the main drain is not only kept in accord with the normal atmospheric pressure, but is also swept by a constant current of air. If there be more than one stack or vertical line of soil-pipes, each one should extend through the roof separately.

Smaller branch waste-pipes leading from bowls, bath-tubs, sinks, etc., can all connect or discharge into the soil-pipe or main-drain where most convenient, but each branch should also have a vent to the open air, and a separate trap under each sink, or bowl. Without such ventilation for each branch, the discharge of a few gallons of water through any of them will be likely to empty any or all the traps that connect with it, by siphon action. Moreover, the discharge

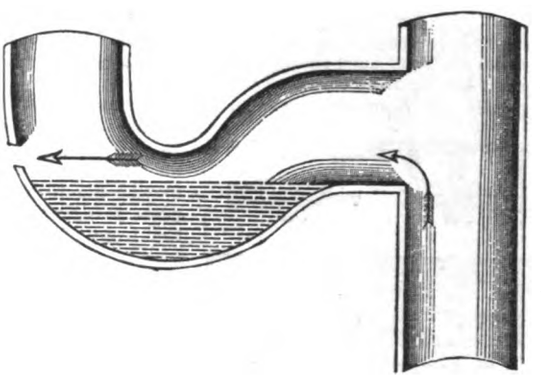

Fig. 9.

of water down the vertical stack itself will often produce this effect, by the friction between the descending water and the air in the branch pipe at the junction. It is always best to lead the waste from each bowl, or tub *separately* to the soil-pipe or drain. If these branches connect with one another before joining the soil-pipe, the drainage through one is very likely to disturb the air in the other, and thereby destroy the seal in their traps. It has been a common practice among plumbers in this country to lead the waste water from bath-tubs, bowls, etc., into the trap of the nearest water-closet, below the water line; but such a practice is never advisable, for several reasons. The discharge of warm water into this large trap heats up its contents, which are generally composed in part of fecal matter, and the steam and odors arising therefrom are very likely, by their expansion when so heated, to find some crack by which they can penetrate into the rooms. Moreover, a slight sagging of one of the pipes or a tipping of the trap itself, which sometimes occurs in time, will throw the connection above the water line and destroy the seal, Another defect in this method of connecting wastes of bowls to water-closet traps arises from the length of waste under the floor which has so little fall that the trap water holds the water back in it for several feet, where it has ample time to make noxious deposits. (See Fig. 10.)

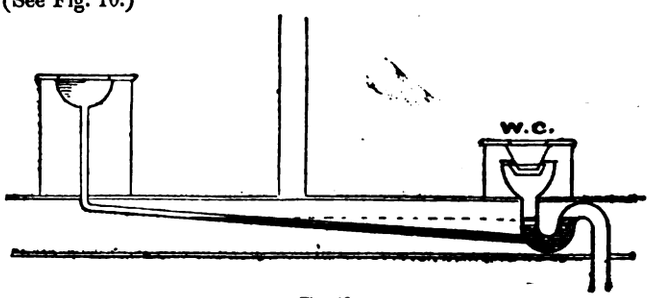

Fig. 10.

It is usual to provide a small tank or cistern in the upper part of a house, from which water can be drawn, when wanted, more rapidly than from the small pipe which supplies the house from the street. Such a tank is fed by a faucet governed by a float, so that it is kept nearly full. As any defect in the action of the float might cause the tank to overflow, it must always be provided with an overflow-pipe, to carry off the water in such an emergency. If this overflow-pipe is connected to a waste or drain-pipe, the foul air will rise through it and escape through its open mouth at the top, where it may taint the water by being absorbed by it, or taint the air about it. No trap placed upon such an overflow can be relied upon, for the flow occurs so seldom that such a trap would lose its water by evaporation and

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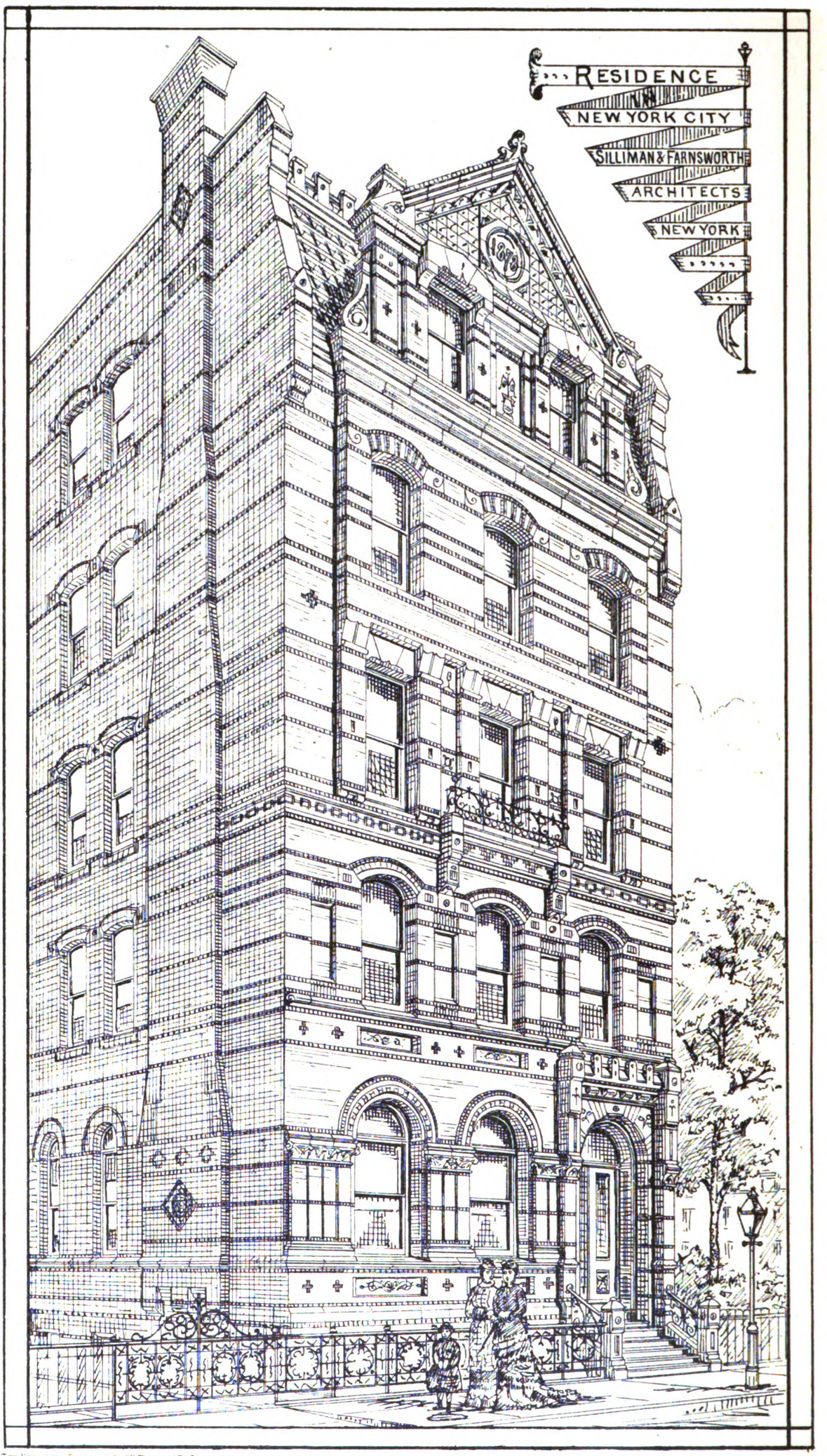

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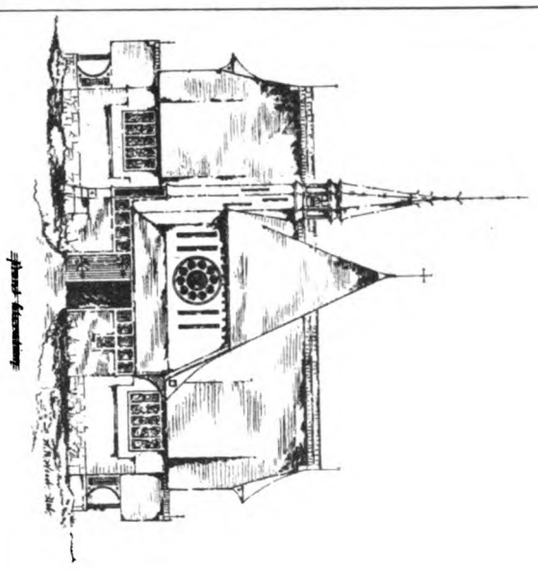

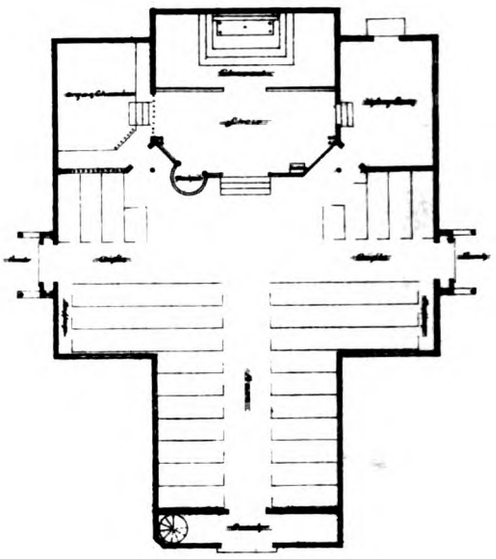

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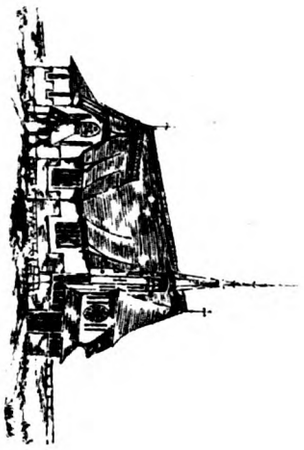
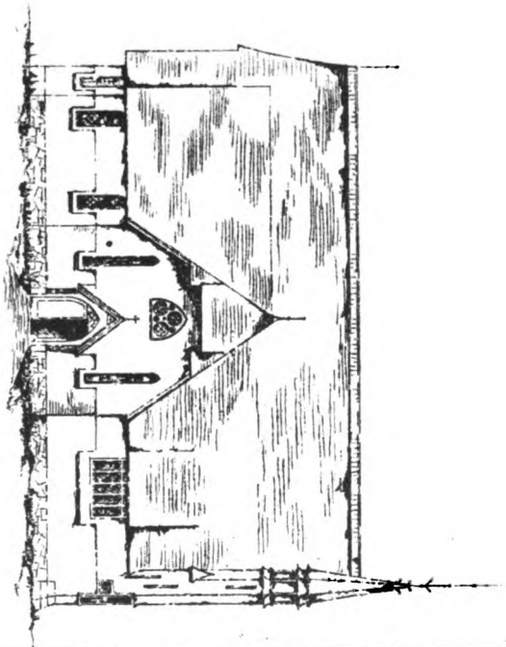


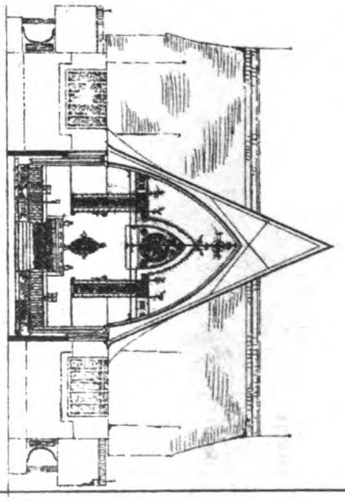
Design for a Church on the Sea Shore

— *William Ibbitt Wood, Architect.* —

764 Broad St. Newark N.J.

Scale





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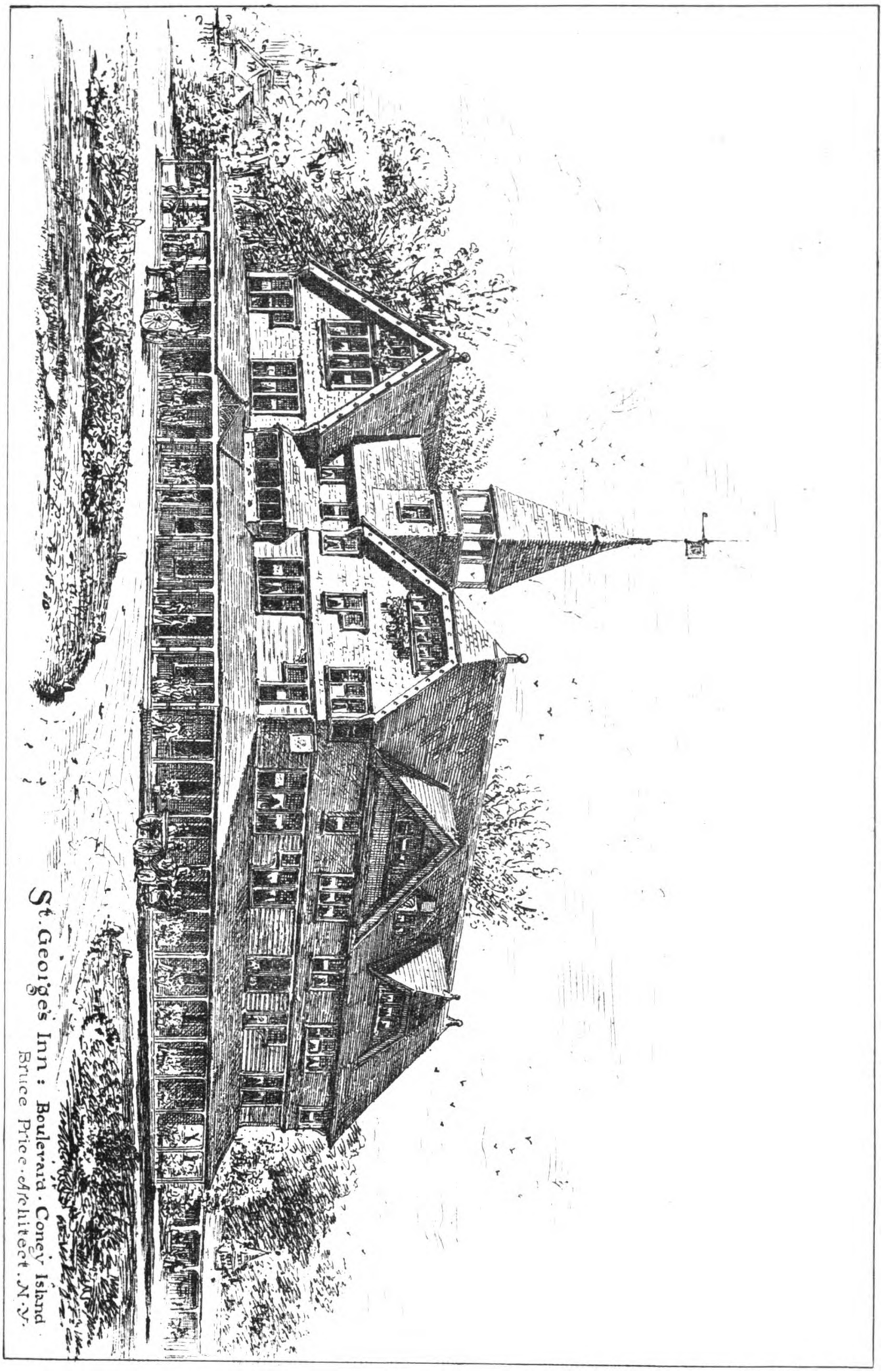

St. George's Inn: Boulevard. Coney Island.
Bruce Price. Architect. N.Y.

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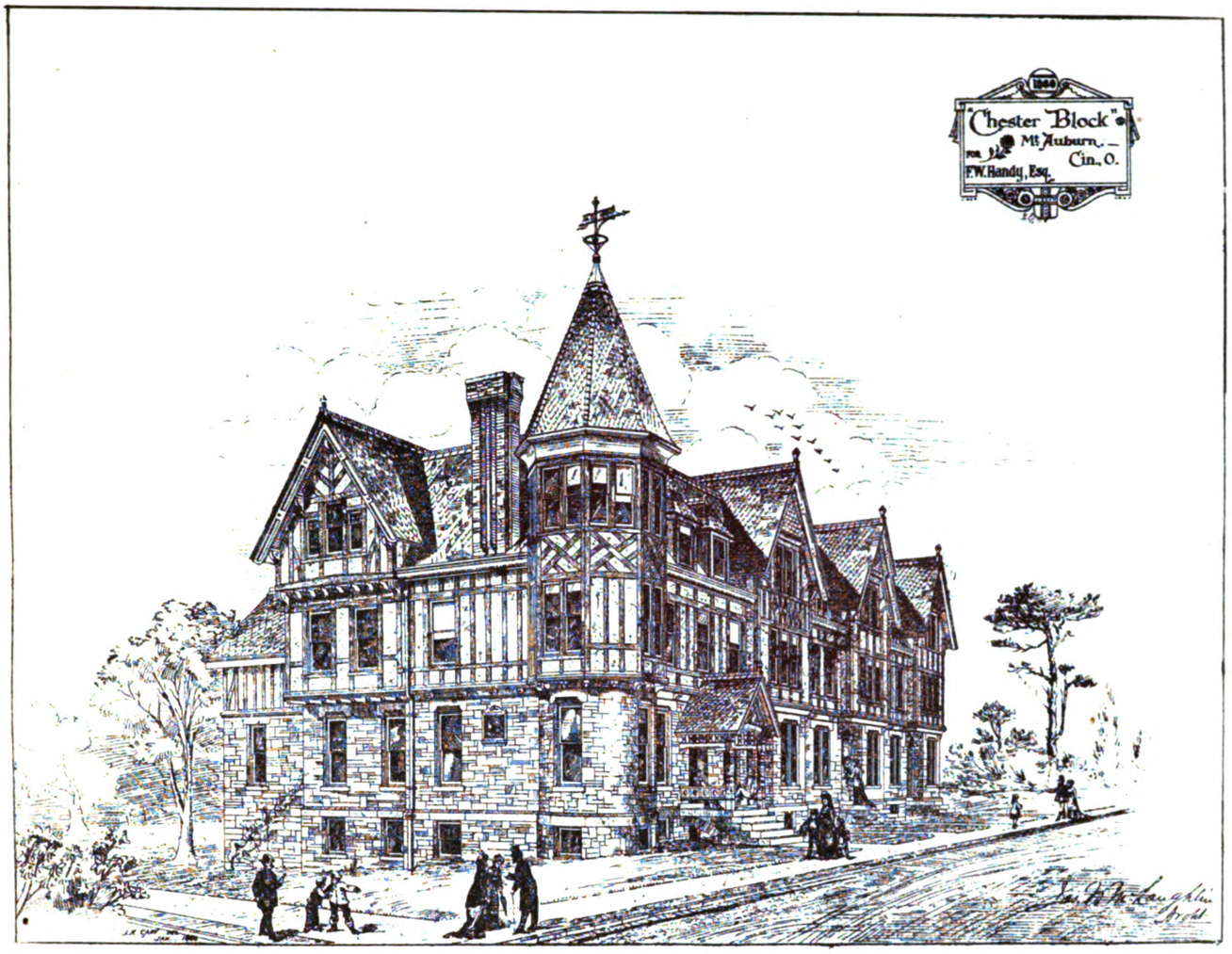

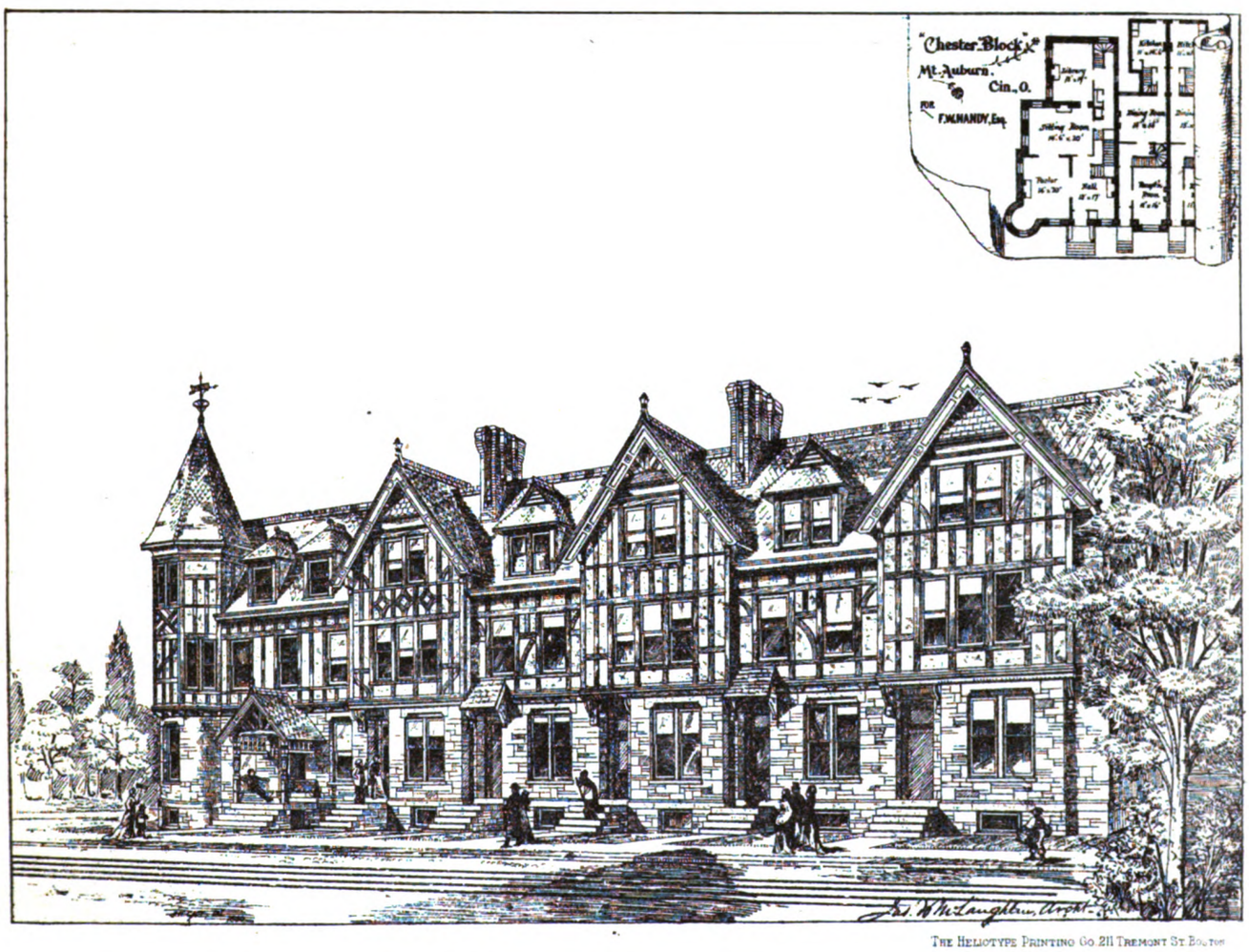

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soon become worthless. The safer way is to discharge such overflow pipes in the open air, either outside the house, in a rain-spout, or on the roof. If this cannot be conveniently arranged, they should be allowed to discharge over an open sink or bath-tub, or similar receptacle, without direct connection with the drains. Where no public water supply exists, large tanks for storage of rain-water are sometimes constructed as a source for domestic supply, located under the ground, with overflows discharging into the main-drain. Such a course should never be allowed. No intervening trap can serve for stopping the back flow of gas, because the overflow does not occur often enough in dry weather to ensure the presence of water in such traps. Such overflows ought to be discharged on to the surface of the ground, or in a pit filled with loose stones in a porous soil, where the water will readily soak away at all times. An instance occurred within my own observation a few years ago, where the overflow of a rain-water tank discharged into the main drain. This became choked with grease, and set back all the sewage of the house into the cistern, through the overflow. The water was used for all domestic purposes, and its pollution was discovered only through the nauseous taste it had acquired after some weeks' accumulation of sewage in the cistern. This leads us to the question of grease in drains, a prolific source of annoyance in our climate. The grease comes from the washing of dishes in kitchen sinks, which goes down the wastes mixed with warm water in a fluid state. It soon becomes chilled in cool weather, and adheres to the sides of the drain, where it accumulates continually, till sometimes filling the pipes for long distances. If the drain has a very rapid descent, the flow of water may sometimes prevent this accumulation, but otherwise some provision is needed for intercepting the grease in a small tank. The nearer this tank is to the sink the better, to guard against the choking of the pipe above the tank. Where the sinks are located against the outer wall of the house, the tank is best placed outside the walls, where the grease can be removed without creating a nuisance in the house. Such a tank is shown in this section (Fig. 11), built of brick and hydraulic cement,

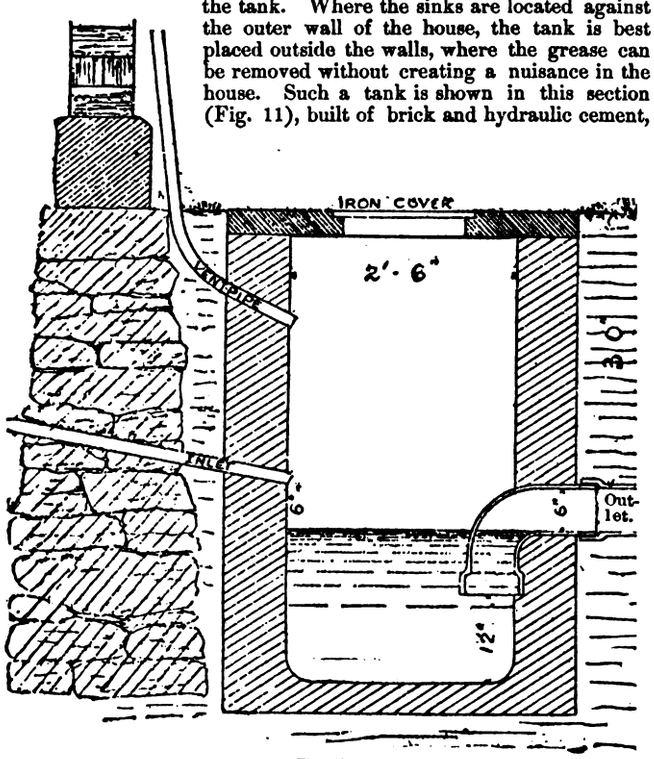

Fig. 11.

plastered smoothly inside. For small and medium houses it should be at least three feet long on the inside, and about two feet wide, with rounded corners. The outlet should be made of a bent joint of pipe dipping under the water, so that the grease, while floating on the surface, will not be drawn into it. The inlet should be at least six inches higher than the outlet, so as not to be obstructed by the accumulation of grease which takes place in the form of a thick scum on the water. It is also best to allow about a foot below the mouth of the outlet in the clear, for accumulation of sand and other solid matter which is heavier than the water. A man-hole cover is placed on the top, through which the grease may be removed as occasion may require. The soil-pipes from water-closets should never discharge into this receptacle. It should be arranged upon the branch leading from the kitchen and pantry sinks only, having its outlet connected with the main drain where convenient. If the sink is not situated near enough to the outside of the house to allow this grease tank to be constructed outside the walls, it can be made in the cellar or basement, of wood, and lined with heavy lead. In such cases, the grease does not cool so readily as on the outside, and if the tank is not of a liberal size, the grease is liable to pass through before being separated from the water. Whenever drains become choked with grease, if the pipe is accessible, it can be cleared by pouring hot water over the outside in a small stream, for half an hour or less. This heats up the whole contents, and the softened grease then passes along with the water that is applied inside. But the better way is to catch the grease before it gets into the pipes. If once allowed to coat the inner walls of the drains, much trouble will ensue.

I have before alluded to the need of getting the plumbing fixtures inside the house arranged as far as possible in compact groups. It is a very common fault among architects to so arrange them that their drain-pipes are led across considerable lengths of floor spaces, with little or no fall, terminating, as before described, in a water-closet trap, just below the floor, which sometimes holds the water for several feet back in this horizontal reach of pipe. (See Fig. 10, above). Whenever a bowl-full of water is discharged into such a flat waste, the lower end of which is filled with water, the air that happens to be in the pipe above such water is displaced and is driven out. Where can it escape? Sometimes it finds a branch waste coming in from another apartment, and is blown up that, through the trap and waste-hole of a wash-bowl in a sleeping-room or dressing-room attached. Sometimes it bubbles up in one's face in the bowl that is discharged. Sometimes it is pushed forward and bubbles up in the water-closet. The result in either case is far from satisfactory, and shows how important it is to give each line of waste an independent and unobstructed course to the main drain or soil-pipe, where the air can find ready communication with the outer air.

THE ILLUSTRATIONS.

"CHESTER BLOCK," MT. AUBURN, CINCINNATI, O. MR. JAMES W. McLAUGHLIN, ARCHITECT, CINCINNATI, O.

THIS block of dwellings is being built by F. W. Handy, Esq., on the corner of Auburn and McMillan Streets. The house on the corner will have a frontage of 35 feet, and the remaining five houses 16 feet each. The walls of the basement and first story will be of blue limestone — found in the vicinity — broken ashlar work, with finish of Ohio freestone; the upper stories will be of half-timbered construction, the spaces between the beams being filled with concrete, composed of Portland cement and coarse sand. The chimneys will be of pressed brick, and the roofs covered with red Akron (Ohio) tiles.

ST. GEORGE'S INN, CONEY ISLAND, N. Y. MR. BRUCE PRICE, ARCHITECT, NEW YORK, N. Y.

HOUSE IN NEW YORK, N. Y. MESSRS. SILLIMAN & FARNSWORTH, ARCHITECTS, NEW YORK, N. Y.

DESIGN FOR A SEASIDE CHURCH. MR. W. H. WOOD, ARCHITECT, NEWARK, N. J.

FIFTY-FIRST ANNUAL EXHIBITION OF THE PENNSYLVANIA ACADEMY OF FINE ARTS.

As this year's was the first of the Annual Philadelphia Exhibitions that I had had the opportunity of visiting, I cannot, of course, say how it may have compared with the show made on previous occasions. Considering it in any but a relative way, however, no one could have called it very good. There were but few excellent works, and of these some had already been exhibited in New York. The works in oil numbered about two hundred and fifty, and those in water-colors and black-and-white, about one hundred and fifty more.

Many visitors must have been as disappointed as myself in finding no canvas from the hand of Mr. Eakins, of whom one is apt to think as the most interesting personality which the Quaker City has yet produced in art, and one of the most interesting, certainly, that the whole country can show.

Mr. Rothermel's is one of the reputations which survive from a day that is not so long past in point of time as far past when judged by the different standards of work and criticism to which we now defer. It seems impossible that he ever should have been considered, as I am told he was, quite the typical artist of Philadelphia, and that his fellow-townsmen should have been content to have him thus quoted. His No. 194, a scene from As You Like It, was rather below his usual average; a figure-piece (No. 46), called Pursuit was better.

To the work of Mr. Senat, another Philadelphian, one gladly turned by way of contrasting the old and the new. Some of his coast studies were remarkably good and strong.

Perhaps the most attractive thing in the collection was Mr. Carroll Beckwith's Falconer (No. 113). It was also the most satisfactory canvas I remember from his brush, though by no means the most striking. It gained in beauty just by its reticence, — by the less violent demand it made upon our instant notice than is made by the majority of Mr. Beckwith's works. The composition was simple: a life-sized, three-quarter figure of a lad with a fluttering falcon on his wrist, relieved against a background of tapestry. The action was spirited, the color rich but subdued, and the modelling without those extremes of relief upon which Mr. Beckwith so often depends for his effects. The face was not that of a conventional model, but was original and full of life and expression. That it was the reverse of refined, in spite of its beauty, was perhaps a touch true to the character and the time in question, — but a little true also, I am afraid, to Mr. Beckwith's ideals.

A landscape by Mr. Macy, painted some years ago, served to mark the creditable degree of progress he has made in the interval.

Among the pictures which one had seen before, but was glad to chance upon again, were Mr. Tiffany's Laborer's Rest, Mr. Moran's

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Normandy Shrimpers, Mrs. Dillon's Chrysanthemums, and Mr. Boggs's Street Scene in Paris, — one of the best things, it may be remembered, in last year's National Academy. Mr. Bacon's Returning from the Bois de Boulogne showed some good painting in his well-known style, but was not very interesting as a composition. Mr. Milne Ramsey's canvases, of which there were four in the exhibition, — rather to one's surprise as he has shown nothing, to my knowledge, in New York for two years, — were the reverse of Mr. Bacon's, — well-planned, but not so well-painted as one believed Mr. Ramsey would be able to paint by this time. He has never equalled, I think, the Bird-Fanciers in the first Exhibition of American Artists. Canvases by Mr. Edgar Ward, Mr. G. W. Maynard, and Miss Plumb, showed their usual average of work. A name quite new to me, that of Mr. George Thompson Hobbs, signed a very good landscape, No. 146, Eventide, painted in a broad, flattish style that results in an effect very unlike that usually aimed at in oils. This kind of work seems to be in favor with many of the new men, who eschew varnish altogether on occasion. There were one or two marked examples of this in this year's Society of American Artists, and for landscape work, at all events, it is a style not without its specific value.

No. 191 was a strong portrait by Miss Ellen Warren; the textures were good, if the flesh were a little hard, and the whole thing full of character and promise.

Among the drawings, the best were by Mr. Muhrman, Mr. Blum, and Mr. Hopkinson Smith. Most of them had been already seen in New York. Scribner & Co. exhibited a large number of the good designs of which they have become possessed in the course of their business, among which every one must have been delighted to find again Mr. Chase's magnificent pen-and-ink portrait of Wilhelmj.

Beside the collections which are the property of the Academy, and on permanent exhibition in the other wing of their building, I found also a loan collection the property of Mr. Harrison Earl, consisting of about sixty small pictures, most of them German and by second-rate artists. There was nothing of much interest among them, except the Spanish Smugglers of Jules Worms, and the Interior of a Stable by Verschuur.

Belonging, I am told, to the Academy, but shown in the same section with its Annual Exhibition, was M. Carolus Duran's superb full-length of Madame Modjeska, which was once on exhibition for a short time at Goupil's in New York, and which never should have been allowed to leave that city if its connoisseurs could by any means have managed to secure it. The gray velvet dress is a triumph of texture such as one has seldom seen from a modern brush, such, indeed, as the admirers of M. Duran insist can be equalled by no modern brush but his. The velvet surface was as perfect as the satin of some Dutch miniaturist, and the touch that rendered it almost as broad as Velasquez. Nor could any one, who, judging M. Duran from his weakest works, might have pronounced him a painter of fashions and textures only, reiterate such a decision in face of the loveliness of the woman here portrayed. M. Duran is certainly, with all his earnest study of the ancients, not an imitator of them to the loss of his modern individuality. This portrait was as truly and as representatively part and parcel of the nineteenth century, as is the Mona Lisa of the fifteenth, or Titian's Bella of the sixteenth.

I may say, in conclusion, that probably no illustrated catalogue of any collection in any place was ever worse than that of the Fifty-first Philadelphia Exhibition.

M. G. van Rensselaer.

GLASS AS A MATERIAL FOR CONSTRUCTION.

Glass, which was formerly known only as one of the most brittle of substances, and which was used merely for windows and household utensils, has latterly, on account of improvements in its manufacture, been attracting much attention as a material for construction. So much, indeed, has this been the case that, at the last meeting of the Iron and Steel Institute, a paper was read on the "Application of Toughened Glass to Permanent Ways," that is to say, to replace timber as a material for the construction of sleepers. If glass can be made strong enough to bear the rude shocks to which sleepers are subjected, there can be no doubt that it will have a great future before it, not merely for the construction of permanent ways, but for many other purposes. We propose, therefore, to give a short account of the recent improvements in the manufacture of glass, and to show what results as regards strength have been so far attained.

The process of toughening glass was, as is well known, invented by M. de la Bastie. His plan consisted in plunging the manufactured article, when at a white heat, into a bath composed of various sorts of oils and greases. The resulting increase of strength depends greatly upon the relative temperature of the glass and the bath. A systematic series of experiments was carried out by Dr. Schott, and published last year in a German technical magazine, with the object of ascertaining what conditions must be observed in order that the best results might be attained. His first course of experiments was made to ascertain what composition of glass and what temperatures of glass and bath gave the best results. The second set consisted in breaking transversely a number of glass bars, prepared in different ways, and thence deducing the tensional strength of the various samples. The results of the first set of experiments were as follows: As regards composition, a soft crystal glass, composed of soda, lead, and lime, proved but very slightly superior to an ordinary soda-lime glass. Bohemian glass was found to be unsuited to toughening. As regards temperatures, it was found that the hotter the glass when immersed, the better was it suited for toughening. Better results were also obtained from hot than from cold baths. When the glass is comparatively cool in temperature, the bath must be proportionately warmer.

The results of the experiments on the tensional strength of bars of glass are given in the following table: —

Method of Preparation.			Ultimate tensional strength in kilos per sq. mm. = 635 tons per sq. in.
Cooled in annealing oven		1	5.87
		2	5.68
		3	4.69
Cooled carelessly in the air		1	12.66
		2	9.52
		3	9.90
		4	7.22
	Glass.		
Bath 212° F.	Dull red heat	1	36.81
		2	32.47
	Medium red heat	1	17.98
		2	20.51
	Bright red heat	1	54.22
Bath 212° F.	Dull red heat	1	21.58
		2	16.24
		3	23.65
		4	12.03
Bath 248° F.	Medium red heat	1	31.97
		2	32.83
	Bright red heat	1	32.49
		2	29.68
		3	36.03
Bath 248° F.	Dull red heat	1	20.13
		2	11.62
	Medium red heat	1	41.60
	Bright red heat	1	36.30
Bath 356° F.	Dull red heat	1	23.55
		2	17.92
	Medium red heat	1	16.96
	Bright red heat	1	34.36
		2	28.72

A glance at these experiments will show that, whereas ordinary annealed glass possesses a strength of about 5½ kilos per square millimetre, equal to about 3½ tons per square inch, the strength is at once doubled by careless cooling in the open air, and by tempering in oil the strength is brought up to 17.1 tons per square inch, or twice the strength of ordinary cast-iron — in some few instances, a strength of 34.2 tons per square inch having been attained. The experiments also show that the hotter the glass and the colder the bath, the greater the tensional strength; but, as it is impossible to give ordinary glass utensils a very high temperature, as they would not keep their shape, the temperature of the bath must, in accordance with the results of the first set of experiments, be taken higher; and thus it is generally impossible to endow a glass object of complicated shape with the same strength as a common bar of the same material. In consequence of this difficulty, glass of such a nature should be chosen as will give a good result when only heated to a low temperature. A glass rich in silicic acid and poor in lime appears best to fulfil this condition.

The process of tempering in oil, however well it may answer in the case of smaller objects, is ill suited to large plates, which are generally warped while undergoing the operation. This difficulty was got over by Mr. F. Siemens, of Dresden, who adopted the plan of laying the plate-glass while hot between two blocks of cast-iron with polished surfaces. A gentle pressure of a few minutes is enough to effect the toughening of the glass, but care must be taken to maintain the temperature of the cast-iron blocks at the proper point, in order to attain good results.

The application of glass to railway sleepers was, we believe, first made by Mr. H. Lindsay Bucknall, Assoc. Inst. C.E. The sleepers are cast to any required shape in moulds, and are toughened by a new process, also invented by Mr. F. Siemens, full details of which have not as yet been made public; but it is understood that the moulds are made of a peculiar composition into which plumbago enters largely, and then, contrary to the usual practice of toughening, the sleepers are annealed for five hours. Any fixings of iron are put in red hot, while the glass is in a fluid condition, and when cold the glass and iron hold rigidly together. The cost of this toughened glass is, weight for weight, about the same as that of cast-iron; but as the specific gravity of the glass is only about one third that of iron, it is evident that for equal dimensions the glass sleeper will only cost one third of the iron one.

The problem of finding a good material for sleepers has long been a perplexing one. Timber has been continually getting scarcer and dearer, and is subject to rapid destruction, especially in tropical countries, such as India, where it is exposed to the ravages of ants. Iron is expensive, and if not well looked after is very liable to corrosion. For glass the advantages are claimed that it is cheap, light, strong and durable, and easily manufactured. In respect of durability, unless broken, we can well believe that glass is indestructible. Some experimental tramway sleepers have, we understand, been laid down upon the North Metropolitan tramways. They measure 3 ft. by 6 in. by 4 in., and are placed longitudinally, the upper surface being specially adapted to receive the rails. Similar specimens have been

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tested at Mr. Kirkaldy's works, at Southwark. They had supports 30 inches apart, and the average transverse breaking-load was found to be five tons. Since these have been laid down, others have, we understand, been tested, which have given an average resistance of 7½ tons.

Old as is the manufacture of glass, it is evident that these various processes of toughening are still in their infancy, and further improvements may doubtless be looked for. Should their result be to make glass an absolutely trustworthy material, the demand for it will be very large, not only for the purpose of permanent ways, but also for numerous other objects. Already we hear that Mr. Bucknall intends to manufacture pipes for water and gas works, for drains and chemical purposes, as well as transparent bricks, telegraph insulators, and numerous other articles. It is not much to the credit of English manufacturers that Mr. Bucknall was unable to obtain co-operation from any of them in his earlier experiments, but was obliged to have resort to Mr. Siemens's well-known establishment at Dresden, where, at a cost of 32*s.* 6*d.* his first glass sleeper was produced, the corresponding quotation made by the home manufacturers to whom he first applied having been between £70 and £90. — *Universal Engineer.*

NOTES AND CLIPPINGS.

COMPETITION DECIDED. — In the recent competition of designs for city dwelling-houses the four prizes of one hundred dollars each have been awarded to Mr. Robert Brown of Boston, Mass.; Mr. J. H. Friend of New York, N. Y.; Mr. T. J. Gould of Providence, R. I., and Messrs. Rossiter and Wright of New York, N. Y.

THE PROPOSED MONUMENT TO THE PRINCE IMPERIAL. — A motion is to be introduced in the House of Commons that the erection of a national Napoleon memorial in Westminster Abbey would be inconsistent with the national character of the edifice, opposed to the sentiments of the English people, and calculated to impair the friendly relations with France.

ARANSAS PASS IMPROVEMENT. — Col. Sedgwick is now actively engaged in conducting for the United States government the work of improving Aransas Pass, from Aransas bay, Texas, to the Gulf of Mexico, and the success of the jetty system in securing deep water and preventing accumulations in front of the pass, it is thought, is already assured. This enterprise will, of course, greatly promote the commercial intercourse of western Texas, and the vast regions beyond, with the outside world. The authorities of the Southern Pacific Railroad, who are looking anxiously for an Atlantic terminus somewhere on the Gulf of Mexico, will no doubt watch the success of this work with deep interest. The distance from San Francisco to Rockport, the nearest available harbor on Aransas bay, is only 1,969 miles, or 134 miles nearer than to Galveston, and the probabilities are that this, or some other point on Aransas bay, will eventually become the terminus of the Southern Pacific Railroad.—*Baltimore American.*

REMOVING THE NATIONAL GALLERY, LONDON. — It is stated that a Ministerial application is about to be made to the Governors of Dulwich College for a site on their magnificent property with the view of adding the gallery of pictures bequeathed to Alleyn's Charity by Sir Francis Bourgeois as a separate wing to the proposed Grand National Building at Dulwich. Whether this odd rumor have any foundation or not, it would be premature to inquire. In any case, the removal of the National Gallery from its existing position cannot be looked upon as anything more than a remote potentiality. Still, while foreseeing the storm of opposition with which the proposition would be met by the friends, or the professed friends, of popular art education, the migration of the national museum of paintings from Charing Cross to the rural shades of Dulwich might be advocated on more than one ground. In the first place, there would be an immense gain in purity of atmosphere. Next, Dulwich is only a short distance from the metropolis, and is easily accessible by railway and omnibus, while foreigners and country cousins desirous of visiting the gallery would be able to enjoy a pleasant outing as well as an art pilgrimage. Finally, the existing National Gallery is structurally incurably hideous. The lamented Mr. Edward Barry had prepared plans for masking the tasteless pile with a handsome screen; but the death of the eminent architect leaves the hands of the Government untied, and if the National Gallery could be transferred to Dulwich, and adequately housed there, in process of time it might be advisable to consider the feasibility of pulling the old building down bodily and erecting a range of new and splendid government offices on its site. — *London Telegraph.*

RECENT DISCOVERIES AT POMPEII. — The recent excavation of a house in Pompeii, which is perhaps the largest and best preserved of all antique dwellings known, has excited the greatest interest. The building, two stories high, contains a double atrium and tablinium. In the middle of the spacious peristyle there stands an ornamental fountain. A complete bath has also been found which doubtless will throw much light upon questions of arrangement. It is this part of the complex Roman dwelling-house upon which the opinions of archæological authorities have hitherto been most at varience. The decorative paintings of the interior have been executed with great taste and are well preserved. Those of the second story, representing marine animals, are especially interesting. The frescoes of the two wings of the building show scenes of animal life, like those so much in vogue about the advent of the Christian era, and known from many examples previously discovered in the buried cities. These excellently preserved works, so characteristic of the time and place in which they were executed, cannot but add valuable illustrations to the history of Roman painting. They are said to markedly betray the influence of great art. An early publication of the plan and details of the house is promised by the Archæological Society.

JOHN WESLEY'S CHAPEL. — Wesleyan Chapel, in City road, London, founded by John Wesley, which was partially destroyed by fire in December last, has been restored and re-opened.

THE HEALTH OF ROME AND THE WORKS ON THE TIBER. — The *Giornale dei Lavori Publici*, of Rome, of May 12, publishes an appeal made to the Minister of Public Works as to the danger to the public health involved by the present scheme for the walling of the Tiber through that city. The removal of all obstacles that raise the level of the bed of the river has been generally admitted to be the first object that should be sought by the engineer. From 50,000*l.* to 60,000*l.*, however, have been spent already on the works, and no attempt to remove the most mischievous bar in the channel, that caused by the ruins of the Pons Triumphalis, has yet been made. Heavy indemnities have to be paid for the ground required for widening the bed of the river, above the Ponte Sisto, to the prescribed width of 100 metres. The works here carried on have been rich in archæological discoveries, but have caused, the writer of the appeal in question states, an outbreak of fatal fever in what was formerly the most healthy quarter of Rome. And they have served, as do the present condition of the Pantheon and that of the Cloaca Maxima, to prove distinctly the fact of the raising of the bed of the river. To build enormous quay-walls, 18 metres high, through the city, without either deepening the channel of the Tiber, or carrying down the foundation of the walls themselves to an adequate depth, is, it is urged, worse than useless. The rectification of the channel of the river below Rome, and the encouragement of an effective scour, by removing such obstacles as are caused by fallen bridges, are evidently objects of primary importance with a view to diminish the effect of floods. Published figures show that the fall of the river in its course through Rome is nearly three times as rapid as that which is obtained to the west of Ripa Grande; and this is enough to show the effect of such obstacles to the current as those of which the writer in the *Giornale* complains. The Ponte Sisto, the two bridges to the Isola di San Bartolomeo, and the remains of the Sublician Bridge, all form obstacles to the scour of the river through Rome. But even were these removed, the fall to the sea is not such as to promise much lowering of the channel by natural erosion alone, although it is clear that the rectification of the channel below the city, and the removal of every obstacle to the current, is a work of at least as much importance to the safety and health of Rome as are the new quay-walls of the Tiber.

THE "CASA DEL CENTENARIO" AT POMPEII. — The Naples correspondent of the *Daily News* writes: "The house which was begun to be excavated at the celebration of the centenary of Pompeii, and is, therefore, called 'Casa del Centenario,' and from which I then saw three skeletons dug out, has proved to be the largest hitherto discovered, and is of peculiar interest. It contains two atria, two triclinia, four alæ or wings, a calidarium, frigidarium, and tepidarium. It occupies the entire space between three streets, and most likely a fourth, which has yet to be excavated. The vestibule is elegantly decorated, and its mosaic pavement ornamented with the figure of a dolphin pursued by a sea-horse. In the first atrium, the walls of which are adorned with small theatrical scenes, the pavement is sunk and broken, as if by an earthquake, and there is a large hole through which one sees the cellar. The second atrium is very spacious with a handsome peristyle, the columns — white and red stucco — being twenty-six in number. In the centre is a large marble basin, within the edge of which runs a narrow step. On the pedestal at one side was found the statuette of the Faun which I lately described. The most interesting place in the house is an inner court or room, on one side of which is the niche, with tiny marble steps, often to be seen in Pompeian houses. The frescoes on the walls are very beautiful. Close to the floor runs a wreath of leaves about a quarter of a yard wide, with alternately a lizard and a stork. Above it, about a yard distant, droop, as if from over a wall, large branches of vine or ivy and broad leaves like those of the tiger-lily — all very freely, naturally, and gracefully drawn. At each corner of the room a bird clings to one of these branches. Then comes a space — bordered at the top by another row of leaves — in which is represented a whole aquarium, as if the room were lined with tanks. There are different sorts of shells and aquatic plants lying at the bottom of the water, and swimming in or on it all kinds of fish, jelly-fish, sepias, ducks, and swans, admirably sketched with a light yet firm touch. The ripples made by the swimming ducks are indicated, and one duck is just flying into the water with a splash. On each side of the niche this amusing aquarium is enlivened by a special incident: To the left a large octopus has caught a monstrous muræna (lamprey) — which turns round to bite — in its tentacles; to the right a fine lobster has pierced another muræna through and through with its long, hard feelers, or horns. These creatures are painted in the natural colors very truthfully. On the left wall of the room, above the fishes, are two sphinxes, supporting on their heads square marble vases, on the brim of each of which sits a dove. Behind the niche, and on the left side of the room, runs a little gallery with a corridor underneath, lighted by small square holes in the border of hanging branches. The wall of this gallery behind the niche is decorated with a woodland landscape, in which, on one side, is represented a bull running frantically away with a lion clinging to its haunches; on the other, a horse lying struggling on its back, attacked by a leopard; all nearly the size of life. On each side of the doorway is painted, respectively, a graceful doe and a bear. The other rooms are also very beautiful; one with a splendidly elegant design on a black ground; in another a small fresco representing a man pouring wine out of an amphora into a large vessel. The bath-rooms are large and elegant, the cold bath spacious and of marble. In one room a corner is dedicated to the *lares* and *penates*, and in the fresco decoration, among the usual serpents, etc., I noticed the singular figure of a Bacchus or bacchante, entirely clothed with large grapes. In one of the mosaic pavements is a head of Medusa, the colors very bright and well preserved. As some of the rooms are only excavated to within two or three feet of the floor, it is possible that many valuable ornaments or statuettes may yet be found, as everything indicates that this splendid house belonged to some rich citizen."

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BUILDING INTELLIGENCE.

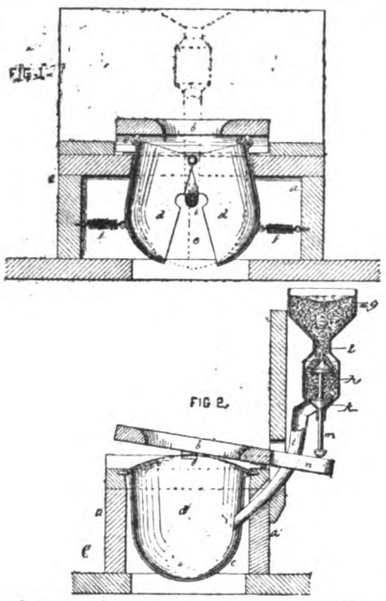
[Reported for The American Architect and Building News].

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

226,011. Commode. — William J. Winghart, New York, N. Y. This invention provides a commode for steamboats, ships, or railroad-cars, which will protect the person from the strong draughts, cold, or waves. *a* indicates the frame-work of the commode; *b*, the seat hinged to it, and *c* the chamber of the commode. In this chamber, below the seat, is a pan, *d d*, which acts both as a receiver of the deposit and a valve to close the external aperture of the commode, and thus protect the person dnring use. This pan is of proximately hemispherical form, divided into two movable sections, which are pivoted at the top edge in the frame so as to open or close readily. The top edges of the sections *d d* of the pan are fitted with



short lugs *e e*, which bear against the under side of the seat, while strong springs *f f*, arranged as shown, tend to constantly open the sections of the pan and raise the seat into the position illustrated. When the seat is depressed the sections of the pan close together automatically, the edge of one section fitting into the other, as indicated by dotted lines. When the seat is released the springs separate the sections of the pan and allow the discharge of the deposit. In some cases the commode is provided with a means of flushing the pan with water, sand, or earth, to prevent the adhesion of the deposit and render the action of the commode more cleanly, which is shown in Fig. 2. Here *g* indicates a reservoir of fine sand; and *h*, a measuring-chamber, into which the hopper discharges, and from the base of which a chute, *i*, descends to the pan. In the measuring-chamber a discharge-valve, *k*, governs the outflow of the measured charge through the chute *i*, while a charging-valve, *l*, governs the inflow from the hopper *g*. These valves are arranged on the same stem *m*, which extends through the base of the measuring-chamber and rests upon a prolongation, *n*, of the seat, so that when the seat is depressed and the pan closed the discharge-valve will be opened.

228,722. Bath-Tub. — Henry Arnd, St. Louis, Mo.

228,729. Sash-Fastener. — Lorenzo D. Cleaveland, Chicago, Ill.

228,747. Hatchway-Guard. — William I. Ely, Detroit, Mich.

228,754. Hoisting and Dumping Apparatus. — Cornelius A. Haring, Peoria, Ill.

228,755. Wrench. — Randolph Hayden, Middletown, Conn.

228,766. Bench Plane Gage — Cyrus Kinney, Windsor, Ontario, Canada.

228,768. Combined Square and Level. — Daniel Masten, Binghamton, N. Y.

228,776. Door-Check. — Lewis C. Norton, Boston, Mass.

228,784. Blind-Awning. — Luther T. Seaver, Medford, Mass.

228,810. Ratchet Bit-Brace. — Albert D. Goodell, Miller's Falls, Mass.

228,811. Bit-Brace. — Albert D. Goodell, Miller's Falls, Mass.

228,822. Fire Escape. — George Lockhart, Tarrytown, N. Y.

228,827. Wrench. James A. Mell, Moline, Mich.

228,856. Door-Spring. — Gerhart Bauman, Middletown, Conn.

228,878. Wood-Bending Machine. — Frank Denninger, New York, N. Y.

228,886. Rotary Cut-Off Saw. — Luther W. Green, Williamsport, Penn.

228,897. Lead and Crayon Holder. — Joseph Hoffman, New York, N. Y.

228,901. Fire-Brick. — Alfred E. Hunt, Nashua, N. H.

228,903. Bevel. — Edward A. Johnson, Ansonia, Conn.

228,917. Self-Closing Faucet. — Joseph C. Miller, Malden, Mass.

228,923. Pencil-Sharpener. — Eugene E. Norton, Hartford, Conn.

228,925 Hatchway-Guard. — George Parker, Boston, Mass.

228,927. Device for Preventing Entrance of Sewer Gas into Buildings. — Albert F. Pflughaupt, Jr., Brooklyn, N. Y.

228,929. Tile Facing and Squaring Machine. — Chas. F. Powers, Sutherland Falls, Vt.

228,947. Manufacture of Tubes. — John H. Seaman, Brooklyn, N. Y.

228,957 Treatment of Sewage. — Bruno Terne, Philadelphia, Penn.

228,958. Calipers and Dividers. — William H. Warren, New York, N. Y.

220,960. Roofing and Paving Material. — Cyrus M. Warren, Brookline, Mass.

228,961. Package for Pencils. — Edward Weissenborn, Jersey City Heights, N. J.

228,969. Brick-Machine. — Richard M. Johnson, Houston, Texas.

9,251. (*Reissue.*) Shingle-Cutting Machine. — William Goldie, Fenton, Mich.

9,257. (*Reissue.*) Machine for Cutting Shingles. — William Goldie, Fentonville, Mich.

SUMMARY OF THE WEEK.

Baltimore.

Building Permits. — Eighteen building permits have been issued since the last report, the following only are of sufficient importance to be mentioned:

Jas. B. Crook, 2 st'y brick building, cor. Schroeder and Booth Sts., 32′ x 56′.

Chas. Friese, 3 st'y brick building, on Canton Ave., between Bond and Bethel Sts.

John McHale, 3 st'y brick building, on Lemon Sts., between Bartlett and Scott Sts.

Chamber of Commerce. — The Board of Directors of the Chamber of Commerce Building Company have notified the tenants still remaining in the buildings on Second and Holliday Sts., and Post Office Ave., to vacate by July 1st, as the Company intend to begin tearing down the old buildings by that time, to make room for the new one.

Factory. — Messrs. G. Dambman & Bro. are building a large chemical factory on the corner of Leadenhall and Stockholm Sts., 32′ x 365′, two stories high, cost $30,000. Mr. Chas. L. Carson is the architect, and Mr. Wm. Furgurson is the contractor.

House. — Mr. M. Lieblich is about to build a large dwelling on Eutaw St., above Madison St., 24′ x 40′, three stories high, cost $10,000; to be of brick and stone. Mr. Chas. L. Carson is the architect.

Insane Asylum. — The trustees of Bay View Asylum are about to erect a building for the city's insane, $50,000 having been appropriated for the purpose. Mr. Frank E. Davis has been appointed the architect.

Institution. — On June 16 the corner-stone of the new Centenary Biblical Institute, which is now in course of construction at the corner of Fulton and Edmonson Aves., was laid.

Boston.

Hotel. — Plans are made by Mr. Fred Pope, architect, for a hotel for Mr. J. A. Prescott, on the land measuring 72 ft. on Church St., 105 on Tennyson, and 125 on Columbus Ave.

Brooklyn.

Building Permits. — *Jay St.*, 1 four-st'y brick store and tenement, 24′ x 48′ 8″; owner, Arthur McAvoy, 255 Clermont Ave.; architect, Thos. F. Houghton.

Hart St., 2 two-st'y brown stone dwells., 18′ x 12′; cost, $4,500 each; owner, Arthur Taylor, 822 De Kalb Ave.

Adelphi St., cor. Willoughby Ave., 1 four-st'y brown stone dwell., 25′ x 45′ x 21′ 6″ x 45′; cost, $10,500; owner, John Flynn; architect, Thos. F. Houghton; builders, Owen Nolan and Daniel Boyle.

Bowne St., cor. Van Brunt St., 1 one-st'y brick machine-shop, 50′ x 190′; cost, $6,500; owners, H. R. Worthington & Co.; builder, Eli Osborn.

St. James Pl., 4 three-st'y brown stone dwells., 18′ 9″ x 45′; cost, $7,000 each; owner, T. Fischer; architect, R. Dixon; builder, J. Stafford.

Pier between Amity and Pacific Sts., 1 frame elevator and storage shed, 28′ x 578′ 2″, and in height one, two, and seven stories; cost, $35,000; owners, David Dows & Co., 20 South St., New York; builders, Wm. H. Hazzard & Son.

Bushwick Ave., 3 two-st'y brick dwells., 16′ 8″ x 36′; cost, each, $2,500; owner, A. Miller; architect and builder, T. Miller.

Atlantic Ave., No. 93, 1 four-st'y brick stores and flats, 25′ x 70′; cost, $8,000; owner, David Martin; architect, Amzi Hill; builder, John P. Seeley.

Second St., 1 three-st'y frame grain elevator, etc., 65′ x 40′; cost, $6,000; owner, L. B. Shaw, 93 Remsen St.; architect, D. E. Harris; masons, James Ashfield & Son.

Alterations. — *Fulton St., Nos.* 386 *and* 388, front alterations, etc.; cost, $8,000; owner, A. J. Nutting, Broadway and Broome St., New York; architect, F. H. Coles; builder, I. B. Jacobs.

Fulton St., three-st'y brick extension, 20′ x 60′; cost, $10,000; owner, James Carey, 361 Fulton St.; architect, R. Dixon; builders, P. J. Carlin and Long & Carnes.

New York.

Alterations. — *East Thirty-Sixth St., No.* 4, one-st'y brick extension, 11′ x 15′, also internal alterations and repairs; cost, $8,500; owner, A. Woolf; architect, William H. Hume; masons, J. B. Smith, Prodgers & Co.

Avenue C, No. 79, two-st'y brick extension, 20′ x 23′, to be built; cost, $2,000; lessee, H. Frank; architect, Chs. Sturtzkober; mason, John Fish.

West Twenty-Third St., No. 512, five-st'y brick extension, 25′ x 93′ 9″; cost, $11,000; owners, S. S. Constant, *et al.*; architect, Thomas R. Jackson.

Grand St., No. 550, new store front put in first story; cost, $2,300; owner, H. C. Tuttle; mason, N. J. Ackerman; carpenter, Alexander Steel.

East Seventeenth St., No. 1, three-st'y brick extension to be built, 18′ x 21′, store front to be put in first story and internal alterations; cost, $7,000; owner, Andrew S. Thorp; architect, Alfred H. Thorp; masons, J. & W. C. Spears; carpenters, Grissler & Fausel.

Lewis St., No. 195, factory, a fourth story to be added, a four-st'y brick extension, 29′ x 32′, to be built, and internal alterations; cost, $3,500; owner, Angelo Ghiglioni; architect, Walter West; mason, Richard Shapter; carpenter, Guy Culgin.

Clinton Pl., No. 89, five feet to be added to present height, five-st'y brick extension, 21′ x 32′, to be built, and to be altered internally; cost, $8,000; owner, Ella Glover; architect, Arthur Gilman; mason, E. Briggs.

West Fortieth St., No. 58, three-st'y brick extension, 9′ x 20′, and internal alterations; cost, $5,000; owner, Charles Banks; architect, W. Wheeler Smith; masons, Sanderson & Son.

West Fiftieth St., No. 39, one-st'y brick extension, 15′ x 34′ 8″; cost, $4,000; owner, H. W. Curtiss, architect, W. Weeeler Smith; mason, J. J. Tucker.

Fulton St., cor. New Church St., interior alterations; cost, $2,000; owner, Trinity Church; builder, Richard Deeves.

Cedar St., No. 49, internal alterations and new store front; cost, $6,000; owner, Thomas W. Pearsall; architect, James W. Pirsson; builder, John Geagan.

Building Permits. — *Eighteenth St.*, 1 three-st'y brick factory, 60′ x 46′; cost, $20,000; owner, Steam Heating & Power Co., of New York, 16 Courtlandt St.; architects, Smith & Howe; engineer, C. E. Emery.

West Thirty-Seventh St., No. 333, 1 four-st'y brick tenement, 25′ x 62′ 6″; cost, $10,000; owner, F. W. Schwiers, 333 West Thirty-Seventh St.; architect, Wm. Kuhles.

Grand St., Nos. 199 *and* 201, 1 six-st'y brick store, 50′ x 70′; cost, $40,000; owner, John H. Screven, care of Mr. Cruger, Broadway and Fulton St.; architects, Potter & Robertson; builder, Richard Deeves.

Forty-Seventh St., 1 two-st'y brick stable, 17′ x 80′; cost, $5,000; owner, Wm. H. Johnson, 29 New St.; architect, Robert Mook; builder, —— Hopper.

Fifty-Eighth St., 6 four-st'y brick (brown stone front) dwells., 16′ 8′ x 55′; cost, each, $15,000; owner and builder, John Coar, 100 West Thirty-Third St.; architects, Silliman & Farnsworth.

Fifty-Third St., 1 four-st'y brick tenement, 25′ x 42′; cost, $12,500; owner, Wm. Carsy; architect, James Barrett.

Pine St., Nos. 41 *and* 43, and William St., Nos. 45, 47 and 49, 1 eight-st'y brick and stone office-building, 39′ on Pine St., 68′ on William St., 56′ to 64′ deep; cost, $260,000; owners, London & Liverpool & Globe Ins. Co.; architect, Stephen D. Hatch.

One Hundred and Twenty-Seventh St., 3 three-st'y brick (brown stone front) dwells.; cost, each, $7,500; owner, S. S. Stevens, 21 Beekman Pl.; architect, Charles Baxter.

Fifty-Fifth St., 2 two-st'y brick stables, each 25′ x 90′; cost, each, $6,000; owner, A. H. Barney, 82 Broadway; mason, L. N. Crow; carpenters, McGuire & Sloane.

One Hundred and Twenty-Fifth St., 1 four-st'y brick store and tenement, 25′ x 65′; cost, $12,000; owner, Wm. H. Belden, One Hundred and Twenty-Seventh St., near Lexington Ave.; architect, Theo. E. Thomson.

Lexington Ave., 3 three-st'y brick (brown stone front) dwells., 20′ x 34′; cost, each, $9,500; owner, J. J. Davis, Seventh Ave., near Eighteenth St.; architect, Charles Baxter.

One Hundred and Fifteenth St., 3 three-st'y brick dwells., each 16′ 8″ x 45′; cost, each $9,000; owner, Michael Fealey, 2069 Third Ave.; architect, Joseph Mayer.

One Hundred and Twenty-Second St., 4 three-st'y brick dwells., each 15′ x 42′; cost, each, $8,000; owner and builder, Joseph Murray, 315 East One Hundred and Sixteenth St.; architect, J. H. Valentine.

One Hundred and Twenty-Seventh St., 3 three-st'y brick dwells., each 16′ 8″ x 50′; cost, each, $8,500; owner and builder, Joseph Murray; architect, J. H. Valentine.

Thirty-Sixth St., 2 four-st'y brick (brown stone front) dwells., each 20′ 10″ x 55; cost, each, $13,000; owners, estate of James Humes, 157 East Thirty-Sixth St.; architect, James E. Ware.

Thirty-Sixth St., 1 four-st'y brick (brown stone front) apartment-house, 20′ 10″ x 90′; cost, $20,000; owners, estate of James Humes; architect, James E. Ware.

One Hundred and Thirty-Third St., 4 four-st'y (brown stone front) apartment-houses, each 18′ 9″ x 61′; cost, each, $9,500; owners, Brandt & Braender, 140 East Eighty-Sixth St.; architect, John Brandt.

One Hundred and Fifty-Seventh St., 1 two-st'y frame dwell., 22′ x 35′; cost, $3,000; owner, Andrew Schuman, cor. One Hundred and Fifty-Seventh St. and Courtland Ave.; architect, Henry Piering; carpenter, Henry Ellis.

Twenty-Fifth St., 1 five-st'y and basement brick dwell., 25′ x 92′ 8″; cost, $20,000; owner, N. A. Cowdrey, 25 William St.; architect, Henry Fonehann.

Fifty-First St., 2 four-st'y brick tenements, 25′ x 50′; cost, $10,000 each; owner, David Cockburn; architect, Joseph Mayer.

Lexington Ave., 12 three-st'y brick (brown stone front) dwells., 16′ 8″ x 45′; cost, $8,000 each; owner, Wm. Noble, 181 Broadway; architect, Geo. W. da Cunha.

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Pine St., Nos. 41 *and* 43, office-building, 39′ x 64′, eight stories; owners, the Liverpool, London and Globe Insurance Company; architect, Stephen D. Hatch.

Grand St., Nos. 199 *and* 201, six-st'y brick store, 50′ x 76′; cost, $44,000; John H. Scrivin, owner; Potter & Robertson, architects; Rd. Deeves, contractor.

West Thirty-Seventh St., No. 333, four-st'y brick tenement, 25′ x 62′; cost, $10,000; William Kuhles, architect.

Fifty-Eighth St., west of Sixth Ave., row of 6 four-st'y brown stone front dwells., each 16′ 8″ x 55′; cost, each $15,000; John Coar, owner and builder.

Seventy-Seventh St., west of Ave. A, four-st'y brown stone front apartment-house, 25′ x 60′; cost, $12,000; Mrs. J. A. Frank, owner; John C. Burne, architect.

Fifty-Third St., east of Ninth Ave., brick four-st'y tenement, 25′ x 42′; cost, $12,500; William Carey, owner; James Barritt, architect.

One Hundred and Twenty-Fifth St., west of Fourth Ave., brick four-st'y tenement and store, 25′ x 65′; cost, $12,000; W. H. Belden, owner; Theo. E. Thomson, architect.

Fifty-Fifth St., west of Sixth Ave., brick two-st'y stable; cost, $6,000; A. H. Barney, owner; L. N. Crow, architect.

One Hundred and Twenty-Seventh St., west of Seventh Ave., 3 brown stone front three-st'y dwells.; cost, each $7,500; S. S. Stevens, owner; Charles Baxter, architect.

CARDINAL'S PALACE. — For his Eminence, Cardinal McClosky, a white marble palace is to be built, on the northwest corner of Fiftieth St. and Madison Ave., in rear of the cathedral. It will be 64′ x 54′, four stories high and basement, and, in harmony with the cathedral, will be in the Gothic style. The entrance on Madison Ave. will be a porch, flanked with buttresses and pinnacles, surmounted by gables; the jambs of the windows will be moulded in simple designs. Estimated cost, about $80,000. Mr. Jas. Renwick is the architect.

FACTORY. — An addition to the factory of Messrs. Christy, Shepherd & Garrett, 94′ x 25′, is to be built; first story of iron, above of brick and stone; to cost about $14,000; Messrs. Robinson & Wallace, contractors.

On the corner of Avenue D and Thirteenth St., a five-st'y brick factory is to be built for Levy Bros.

INFIRMARY. — An extension covering about 72′ x 30′ is to be made to the Trinity Building, on Varick St. It will be four stories high, of brick and stone, will contain a chapel, and cost about $30,000; Mr. Chas. C. Haight, architect.

METROPOLITAN HOTEL. — An extra story is to be added to the Metropolitan Hotel for the A. T. Stewart estate; Mr. Harris is the architect. The alteration is expected to cost $30,000.

MODEL TENEMENTS. — On Seventy-Second St., corner of First Ave., a lot 205 ft. square is to be covered with model tenements, six stories high, with Mansard. A covered court-yard occupies the centre. The buildings will be of Philadelphia face brick, with fancy brick string-courses, and will cost $259,000. W. Richaed Deeves is the contractor; Messrs. Post & McCord will do the iron work; Messrs. Vaux, & Radford are the architects.

STOCK EXCHANGE. — Mr. James Renwick has filed the specification for the proposed alterations of the New York Stock Exchange. The present building at Nos. 14 Broad and 11, 13, and 15 New Sts., will be raised by the addition of four stories, giving a height of 85 feet for walls, with a Mansard roof 120 ft. in height in front. The plans include also an extension of 24′ x 67′ x 153′, and five stories in height. The alterations are to cost about $230,000. The New York Stock Exchange is the building company; Samuel Lowden, mason; and Edward Gridley, carpenter.

St. Louis.

BUILDING PERMITS. — Thirty-one permits have been issued since our last report, 3 of which are for frame structures of slight importance. Of the remainder, those worth $2,500 or over are as follows: —

Owners Name.	Use.	Stories.	Rooms.	Cost.
J. J. Roselt,	Dwell.	2	12	$3,500
C. Hesemann,	Dwell.	2	5	3,400
M. A Wolff,	Office-building	—	—	4,000
C. Bubinger,	Dwell.	2	5	3,000
Mrs. A. Byrnes,	Dwell.	2	4	4,700
F. Bauert & Bro.,	Factory	3	3	4,600
M. S. Barnett,	Dwell.	2	16	4,000
Mrs. M. B. Tabbot,	Dwell.	2	8	3,500
J. & P. Sheehan,	Dwell.	2	16	4,500
H. A. Cunningham,	Dwell.	3	6	6,000

Philadelphia.

BUILDING PERMITS. — *Wharton St.* — Two-st'y dwell., 15′ x 44′; owner, Robert Montgomery.

Kensington Ave., cor. of Wellington St., two-st'y dwell., 19′ x 40′; owner, Thos. M. Mathes.

Brighton St., No. 1414, four-st'y ware-house, 22′ x 65′; W. Deritt, contractor.

Otis St., cor. Blair St., three-st'y dwell., 17′ x 41′; A. T. Richards, contractor.

Walnut St., cor. Forty-Third St., 6 three-st'y dwells., 20′ x 80′; Abram Ritter, contractor.

Germantown Ave., north of Barr St., 2 three-st'y stores, 17′ x 40′; contractors, McLaughlin & McNamar.

Thirteenth St., No. 331, three-st'y dwell., 15′ x 20′; W. Wilson, contractor.

Otis St., three-st'y brick building, 13′ x 28′; Chas. Borth, contractor.

Warnock St., new front; Dorsey & Smith, contractors.

Fifteenth St., Nos. 241-43, 2 two-st'y back buildings, 8′ x 10′; Jno. Harah; contractor.

Walnut St., No. 1623, two-st'y brick building, 14′ x 32′; Jacob Myers, contractor.

COTTAGES. — Wilson Bros. & Co., architects, have completed plans for four new cottages, each 71′ x 30′, to be built at Fifty-Eighth Sts. and Kingsessing Ave., for the Presbyterian Orphanage.

CLUB-HOUSE. — The Mercantile Club, a Jewish social organization of this city, is building an addition to its house, No. 864 North Seventh St., two stories in height, 43′ x 93′, front is to be of pressed brick, with Connecticut brown stone trimmings; cost, $30,000; owner, E. H. Fitler; contractor, Henry D. Walls; architect, James A. Windrim.

OFFICE-BUILDING. — Messrs. Burnham, Parry, Williams & Co., proprietors of the Baldwin Locomotive Works, have in course of erection a new office-building, to be four stories in height, made of brown stone, at the southwest corner of Broad and Spring Garden Sts.

General Notes.

ASHLAND, ILL. — A two-story frame cottage, seven rooms, is being built; C. J. Salzenstein, owner; Geo. H. Helmle, architect, Springfield, Ill.

ASHLAND, NEB. — An $8,000 block of stores for S. H. Nichols is building, from the plans of C. F. Driscoll, of Omaha.

ATTLEBORO', MASS. — Mr. L. J. Lamb is building a double cottage, 40′ x 40′, cost $3,000. Plans drawn by Palliser, Palliser & Co., architects, Bridgeport, Conn.

AURORA, NEB. — The school-house now building from the plans of Mr. C. F. Driscoll, architect, of Omaha, will cost $4,500.

BELLEFONTAINE, O. — The County Commissioners are engaged with D. W. Gibbs, architect, of Toledo, in arranging plans for remodeling the County Infirmary.

BETHEL, CONN. — E. W. Gilbert, of the firm of Gilbert Bros. of this place, is preparing to build for himself a new Queen Anne house, 44′ x 46′; cost $4,000. Palliser, Palliser & Co., architects.

BERKELEY, CAL. — The Regents of the University have adopted plans for the new Library and Art Gallery prepared by J. A. Remer, architect, of San Francisco. The present design is for a wing of the main or central building. The building will be built of pressed brick, with stone finish. The total cost, including furnishing, will not exceed $50,000.

BRIDGEPORT, CONN. — Mr. W. Richard Briggs has the following work on hand: —

High-School building for the city; cost, $55,000.
House for Judge Morris Beardsley; cost, $10,000.
Double house for Dr. Robert Hubbard; cost, $8,000.
Gymnasium for the Amatie Athletic Association; cost, $8,000 to $10,000.

CAMBRIDGE, MD. — Mr. Chas. L. Carson, architect, of Baltimore, is preparing drawings for the alteration and extension to the Methodist church, to cost $8,000.

COLLEGE HILL, MASS. — A house for Prof. A. E. Dolbear is nearly finished. French Bros. are the contractors, for $6,000. Messrs. Ober & Rand, of Boston, architects.

CORNING, IO. — Mr. C. F. Driscoll, architect, of Omaha, Neb., is building a house for A. M. Beymer; cost, $9,000.

COUNCIL BLUFFS, IO. — The architect of the Bloomer school-house is Mr. C. F. Driscoll, of Omaha; it will cost $29,000.

Mr. C. F. Driscoll is also the architect of three ward school-houses, whose aggregate cost is $6,800.

CRESTON, IO. — Mr. C. F. Driscoll, of Omaha, is the architect of the First Baptist Church now building at a cost of $4,000.

DELAWARE, O. — They have resumed work on the new City Hall. The probable amount it will require to finish it is estimated at about $38,000, $40,000 having already been expended.

DENVER, COL. — The bids for the Superstructure of the Union Depot are all in, and the foundations are nearly finished.

EAST GREENWICH, R. I. — G. B. Congdon, of Providence, R. I., will build a two-story cottage, 32′x40′, to cost $3,000. Palliser, Palliser & Co., architects, Bridgeport, Conn.

HELENA, MONTANA TER. — Mr. C. F. Driscoll, of Omaha, Neb., is building Wing's Opera House, at a cost of $23,000.

Mr. Driscoll is also the architect of a house for Amasa Kellogg; cost, $7,000.

LONGMONT, COL. — A. L. Williams of this place, is putting up a cottage, cost $2,000; from design by Palliser, Palliser & Co., architects, Bridgeport, Conn.

LOUISVILLE, KY. — John W. Friddle, is to build a two-and-a-half story frame dwelling on First St., between College and Breckinridge; cost $2,000. Mrs. Thiesing is to build a two-and-a-half-story brick dwelling, on Broadway St., between Hancock and Jackson; cost $3,000. Henry Relling is to build a two-and-a-half-story brick dwelling, on Second St., between Chestnut and Broadway; cost $4,000. Dr. J. B. Marvin is to build a three-story brick dwelling, on Fourth St., between York and Breckinridge; cost $2,000.

MERIDEN, CONN. — The German Catholics have united with the French Catholics, and have subscribed over $14,000 toward the new church, the French portion having contributed $3,500.

NORWICH, CONN. — The remodelling and reconstruction of the vaults and offices in the Chelsea Savings Bank will be commenced at once, and will cost about $2,000. Palliser, Palliser & Co., architects, Bridgeport, Conn.

NEW HAVEN, CONN. — Mr. R. G. Russell has plans just completed for an engine-house on Howard Ave., costing about $10,000; brick, trimmed with granite.

Mr. Silas Burrows is remodelling his house on Temple St., from plans by Mr. R. G. Russell.

Sargent & Co. are building a brick foundry on Water St., 300′ x 100′; also a machine-shop, 300′ x 50′; R. G. Russell, architect.

Mrs. Merrill is building a brick block on Elm St., containing two stores and a tenement, from plans by Mr. R. G. Russell.

Mr. Jacob Linde is building a block on Congress Ave., of brick, containing store and tenement; costing $10,000; R. G. Russell, architect.

PETERSBURG, ILL. — A two-story brick house is being built; C. B. Laning, owner; Geo. H. Helmle, architect, Springfield, Ill.; cost, $5,000.

PROVIDENCE, R. I. — Mr. Hardin C. Waters is about to build a dwelling, corner of Grove and Andrews Sts.; mason's work, John C. Steere; carpenter's work, A. O. Blake; cost, $35,000.

STATEN ISLAND, N. Y. — Messrs. Wilson Bros. & Co., of New York, have prepared plans for twelve cottages to be built for Mr. T. Donnelly.

SANTA ROSA, CAL. — There is talk of raising $60,000 to build a new court-house for Sonoma County.

SAVANNAH, GA. — Mr. E. F. Baldwin, architect, of Baltimore, Md., has advertised for proposals to complete St. Patrick's Church; the basement story only is built.

SHELBYVILLE, IND. — B. V. Enos & Son, architects, of Indianapolis, are to build a church here which will cost $10,000.

SOMERVILLE, MASS. — A house for Mr. Henry F. Woods is building, on Sycamore St., Winter Hill. Messrs. Ober & Rand, architects; Geo. Snow, builder; cost, $6,000.

SOUTH MANCHESTER, CONN. — A large dwelling-house has just been begun for Mr. Richard O. Cheney; Mr. W. E. Cushing is the architect, and Henry Thompson the builder.

SOUTHPORT, CONN. — A $10,000 house for J. H. Perry is building, from the plans of W. R. Briggs, architect, Bridgeport, Conn.

SOUTHWICK, MASS. — The N. H. & N. R. R. is building a hotel and restaurant at Congamond Lake, size 30′ x 62′; plans by R. G. Russell, of New Haven, Ct.

SPRINGFIELD, ILL. — A two-story brick stable and car-house, 60′ x 157′, is being built for the Citizens' Street Railway Co.; cost, $5,000; architect, Geo. H. Helmle.

A three-story brick house is being built on South Fifth St.; G. S. Mendell, owner; G. A. Sutton, architect; cost, $5,000.

A two-story frame cottage, 8 rooms, is being built on South Fifth St.; C. O. Matheney, owner; Geo. H. Helmle, architect; cost, $2,500.

A two-story brick house, 10 rooms, is being built on North Rutledge St.; Frank Reisch, owner; Geo. H. Helmle, architect; cost, $7,000.

WASHINGTON, D. C. — Mr. Edward Weston, of New York, has just closed the contracts for building an apartment house on Fourteenth St. and Vermont Ave., from plans of Cluss & Shultze, architects. The house is to be over 100 ft. long, fronting on both streets. It will be six stories high. On the upper floors are suites of two and three rooms, with bath-rooms. The four lower stories will have three apartments on each floor, of eight rooms each.

WEST NEWTON, MASS. — A house is building for Mr. Pierrepont Wise. W. H. Stuart is the builder. Cost, $6,000, and measure 37′ x 40′. Messrs. Ober & Rand, architects, of Boston. The building is now boarded in.

WINCHESTER, MASS. — A block of brick stores, measuring 100′ x 150′, is nearly completed. L. P. Soule, of Boston, is the builder; Ober & Rand, architects, also of Boston; cost, $20,000.

Industrial.

CHESTER, PA. — The foundations of the new rolling mill of John Roach have been begun. The building is 243′ x 80′, with two extensive wings.

INDIANAPOLIS, IND. — Nordyke & Marmon Company, are building a 300,000 bushel elevator for Brown & Boyd.

LEOMINSTER, MASS. — Steinway & Sons of New York have contracted with Boynton & Wheeler, to build them a new shop, 120′ x 60′, and three stories high. This contract requires 216,000 feet of lumber, which will be furnished by Hawley Brothers, of Fitchburg.

PROVIDENCE, R. I. — The Brown and Sharp Manufacturing Company is building a new iron foundry. 142′ x 56′, with L 110′ long.

SAUGERTIES, N. Y. — The Kennebec Framing Company of Fairfield, Me., are at work on the frame for a large store-house for a paper-mill.

SPRINGFIELD, MASS. — The Barney Skate Factory is being enlarged. The new part will be 189 feet on Water St., with a wing about 100 feet on Broad St., and the whole three stories high, to be built of brick.

STOUGHTON, MASS. — An addition of 40 by 50 feet is being made to Wallace, Elliott & Co.'s shoe factory.

Bids and Contracts.

BRIDGEPORT, CONN. — The contract for the cut stone work for the Wolfram Building being erected at corner East Main and Maple Sts., was let to the Sutherland Falls Marble Co., of Sutherland Falls, Vermont.

CHAMBERSBURG, PA. — The contract to build addition to jail, was awarded to Messrs. John Reifsnyder, Richard Carr and Nathan Zern, of Chambersburg, for $25,000. Mr. Frank E. Davis, of Baltimore, is the architect.

DAYTON, O. — The accepted bids for work on the court-house are as follows: —

H. G. Cain, excavation, $674.
Kramer & Poock, foundation, $4,925.
J. Clark & Co., brickwork, $13,600.
Johnson & Co., fire-proofing, $13,500.
Daniel Sleutz, concreting, $599.
Carpenter & Raymond, floor tiling, $2,331.90.
Hallinger Bros., plastering, $2,500.
Thomas Hale, painting, $2,864.43.
Lowe Bros., glass, $6,596.
Beaver & Butt, carpentering, $14,960.
McHose & Lyons, iron work, $30,490.
Gibbons & McCormack, plumbing, $2,775.
Burringer & Co., galvanized iron work, $6,121.
Leopold, Sutter & Co., cut stone, $45,500.

There is a difference of over $15,000 between the accepted bids, as above, and the lowest bids on the same work in February last, when the total ran above $60,000, and the Commissioners rejected the bids. All the work, except the fireproofing and plastering, has been awarded to Dayton mechanics, who made the lowest responsible bids. The work of excavation will be commenced at once, and the foundation and superstructure will go forward without delay.

MAYSVILLE, KY. — The George F. Blake Company, of Boston and New York, have taken the contract from the Water Company for a condensing pumping engine of 2,000,000 gallons per diem; also, an auxiliary pumping engine of 1,500,000 gallons capacity. These pumps will have to work against a head of over 350′.

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Publishers' Department.

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REMOVAL.

Among the removals of the season we notice that of Bicknell & Comstock, publishers of architectural books, to their new quarters, 194 Broadway, which will be found much more accessible. They purpose in their new location to offer a full line of architects' materials, and keep in stock all the new and leading works of interest to architects and builders, both American and foreign. They are also now supplying the improved "Sibley's Builder's Level," of which they are now sole proprietors and manufacturers.

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